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# BASIC DATA RELATING TO ENERGY RESOURCES

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## LETTER OF TRANSMITTAL

JANUARY 15, 1951.

*To Members of the Senate Committee on Interior and Insular Affairs:*

When the Senate on August 15, 1950, agreed to Senate Resolution 239 authorizing this committee to make a fuel study, the problems of development and utilization of fuel reserves in a peacetime economy were uppermost in the minds of all concerned. Now we are confronted with the more imperative demands of a wartime economy which range all the way from those involved in preparedness for defense to those involved in actual conflict on a global scale. The scope of our study, therefore, has been actually broadened. We must still obtain the most definite information possible with respect to "available fuel reserves of the United States and the present and probable future rates of consumption thereof," to use the language of the resolution. We must still give consideration to the formulation of a broad "national fuel policy to meet the needs of the United States in times of peace and war." We must be prepared to recommend "methods of encouraging developments to assure the availability of fuels adequate for an expanding economy and the security of the United States."

Now we must give greater emphasis to the problems of security, the problems of accelerated development of energy resources, and to the questions of the comparative availability and effectiveness of specific types of energy resources in a wartime economy.

It is altogether conceivable that the study we have been instructed to make may, even though primary consideration is given to the military aspects, make clear to us ways and means of showing all the peoples of the world how natural resources can be utilized to relieve men everywhere from the misery and the want which, after all, have been the principal causes of war throughout history. To this end it has been planned to conduct, in advance of formal hearings, a round-table discussion by experts in the field of energy resources in order to make available in compact form as comprehensive a review as possible of the best knowledge and best thinking in this field.

As a preliminary step, the following monograph of basic factual information relating to the subject matter of our study has been prepared at my direction under the supervision of Mr. Arthur A. Sandusky of the committee professional staff, with the assistance of specialists from the Department of the Interior and the Legislative Reference Service of the Library of Congress. This material is presented only as a compilation of known facts, and no attempt has been made to interpret the data or to suggest conclusions. Special acknowledgment is made of the assistance afforded Mr. Sandusky by Mr. Ivan Block, chairman, and the other members of the Departmental Energy Committee and Miss Inge Kaiser of the Department of the Interior and Dr. John Rose of the Legislative Reference Service.

The information here presented and current developments on the economic front and on the international scene naturally present certain

questions for consideration of members of the committee and of the public as well. There is, therefore, appended a tentative list of such questions as immediately suggest themselves. The list is not intended to be all-inclusive, nor is there any intention to suggest what the answers should be.

JOSEPH C. O'MAHONEY, *Chairman.*

## QUESTIONS PERTINENT TO A FUEL STUDY

It has been estimated by competent authority that a wartime economy would require an over-all increase of approximately one-fourth in national fuel supplies. The first and most obvious question is whether the Nation can meet this additional requirement. What portion of the over-all increase in fuel requirements would fall upon each of the fuel resources—coal, gas, oil, and hydro power? Could each fuel meet the increased demands that might be made upon it? How exact is our knowledge of our reserves of coal, gas, oil, and hydro power? Are present methods for accumulating data on our fuel reserves satisfactory? What is the excess productive capacity of the coal, gas, and oil industries over current demand? What, if anything, should be done in case of emergency to establish a priority for development of energy from renewable or abundant resources in order to conserve exhaustible energy resources?

What dislocations of our present fuel economy are likely to be caused by the additional fuel requirements for defense? To what extent would defense needs necessitate restrictions on liquid fuel consumption? To what extent is fuel-consuming equipment readily convertible from one fuel to another? Is it possible to redirect the present flow of fuel supplies to meet military needs at new points of consumption? Are the necessary transportation facilities available?

Is our capacity to produce steel sufficient to supply the steel needed for an expanding fuel industry? Specifically, is there enough steel to supply the equipment needed for additional exploratory drilling, to construct plants for production of synthetic liquid fuel from coal or oil shale, to construct pipelines to move oil and gas from Canada and other points, or to provide storage facilities for stockpiling fuels in short supply? What can or should be done to provide an increased ratio of energy production per unit of steel with respect to each of the energy resources?

How would our defense potential be affected by loss of access to Middle East or Venezuelan oil? To what extent do we rely on such foreign imports for domestic needs? If those supplies were lost to European markets, to what extent could we supply the deficiency in order to fuel our allies' war machines and industrial plants?

To what extent has cost of exploration and production of fuels increased in the United States since 1940 in terms of dollars, steel, and manpower? Is the rate of real new discoveries of petroleum rising or falling? Have we reached the point where we can no longer count on finding oil and gas at steadily increasing rates? What further steps can or should be taken to encourage and to expedite exploration and development of oil resources in the United States, Canada, Mexico, and elsewhere in the Western Hemisphere?

Has the discontinuance of the Government subsidy of stripper well operations resulted in any significant decline in total production? Is there a need to reestablish the subsidy program?

Does the situation call for a program of stockpiling liquid fuels and coal? To what extent is stockpiling of fuels feasible?

Have sufficient oil reserves been set up for our Armed Forces? Should consideration be given to the establishment of military and naval oil reserves in our oil-producing submerged lands before favorable areas are taken under commercial leases?

Is the supply of metallurgical coal adequate to meet the needs of the expansion of steel production required for defense purposes? Will the demand for steel require restriction of nonmetallurgical use of the type of coal needed for steel production?

Does the coal industry have the equipment and manpower to provide the increased production that will be necessary to fill the gaps in fuel supply that will be created by defense demands and the resultant shift from liquid and gaseous fuel to coal? How adequate are transportation facilities to move the increased tonnage from mine to markets?

In the event of restrictions on the use of liquid fuel, what would be the effect on farm production in view of the increased mechanization of farms and the increased reliance on liquid fuel? What would be the effect upon the transportation capacity of the Nation's railroads in view of the widespread conversion to oil-burning locomotives?

What advances are being made in the technology of discovery and utilization of fuel resources? What considerations are involved if we are to expand our synthetic fuel program to commercial proportions? Do we have the manpower to mine the coal and shale that would be required? Is steel available for the construction of plants? What type of Government assistance would be required to make synthetic fuel production feasible on a commercial basis?

It has been estimated by competent authority that the nation will have a margin of reserve generating capacity 20 percent above the estimated peak load of 77,400,000 kilowatts in 1953. This estimate is based on certain assumptions, such as the locating of new defense plants in areas where power is available. How valid are such assumptions? How compatible are they with the military requirement for plant dispersal, for instance? Though the over-all power picture may be favorable, what is the situation area by area? Are there critical power shortages in regions that may become strategically important?

# BASIC DATA RELATING TO ENERGY RESOURCES

## INTRODUCTION

The extent to which a nation employs energy resources is a definite indication of the level of living which its people enjoy. It is a definite indication of industrial and military capacity. It is not surprising, therefore, that the United States, with its unparalleled level of living, ranks far ahead of all other countries in total and per capita consumption of inanimate energy. Neither is it surprising that in World War II the United States became "the arsenal of Democracy" and outproduced the entire world. The American people have applied an ever-growing body of science and technology to the wealth of their natural resources and, as a result, have reaped vast quantities of power, heat, and light (the primary forms in which energy is consumed) and have reached a level of industrial competence and social progress never matched before by any other people in history. This industrial competence must now be mobilized perhaps to a degree exceeding the accomplishments of World War II in order to preserve the social progress we have attained and to save mankind from being plunged by the Soviet embodiment of evil into an era of spiritual, political, and economic darkness.

It therefore becomes our task as a people to appraise anew the energy resources we possess, to examine the methods and techniques we have used in developing them and the possibilities of finding new ways to make more efficient use of them. This must be done so that we may not only enlarge and strengthen our defenses but also show the world how the gifts of nature can be made to serve the progress and freedom of man. It is not too much to say that the success with which we meet this new challenge to freedom will be measured by our success in making better use of the energy resources with which this country abounds.

Until the middle of the nineteenth century, hand-cut and hand-fired fuel wood was our primary source of energy. Today, we obtain power, light, and heat in the home and factory by merely pushing buttons or pulling switches to release energy produced from coal, oil, gas, and water. These buttons and switches set into operation a flow of energy often so complicated that comparatively few really know the source of the energy or the manner in which it reaches us.

This development has been rapid and smooth. Thus far it has occurred without leaving in its wake great social or economic dislocations. Fuel has been available, when, where, and usually in the form in which it was desired, although not always at the price people could afford to pay. Despite our enormous consumption of fuel and the sometimes staggering waste attendant upon production and utilization, the Nation's fuel resources are still far from exhausted. These tremendous energy requirements of the expanding economy and of

military security have resulted in a large increase of industrial and social dependence upon a continued supply of fuel.

An examination of these basic resources, therefore, is of the utmost importance in the light of a domestic policy of economic expansion and full employment and of a defense policy that demands increased production of the machines and weapons of war. Heat, light, and power are a basic and essential part of this effort. They must be available continuously in sufficient amounts, in the proper form, and at the right place and time. The national interest requires specific answers to the question whether the resources we need are available in sufficient amounts, whether they are being utilized efficiently, and whether facilities exist to process and transport them in usable form to the place of need at the time of need.

Even apart from the present international crisis, there were signs during the postwar years indicating that the energy economy is not at all times in balance. Power shortages plagued part of the Nation at least intermittently and forced curtailment of domestic electricity consumption and serious interruption of industrial activity. Fuel oil and gasoline shortages, especially in New England and the Middle West, although temporary and local, inflicted hardships. On the other hand, increasing imports of crude oil and residual fuel oil during the last 18 months, created economic dislocations in areas as far apart as the Appalachian coal fields and the oil fields of the State of Texas. All these are spot problems. They cause immediate inconvenience and sometimes suffering and therefore produce requests for solution. The basic problems, however, are: (1) the steadily growing consumption of energy; (2) the gradual shift to the liquid and gaseous among the mineral fuels; and (3) what should be done in anticipation of the eventual approach toward exhaustion of some of our resources.

It is important to seek solutions for these problems, not only that we may be ready for tomorrow and the next day, but so that we will be prepared for 5, 10, and 20 years hence. We know the additional supplies of energy that will be needed cannot be obtained without prior planning and time to put the plans into operation. In the case of hydroelectric power, there must be time for the planning and construction of dams, generators, and transmission lines—certainly not an overnight job. It may take 5 or even 10 years from the blueprint stage to obtain a flow of power. In the case of coal, it may be necessary to construct new mining, cleaning, and transportation facilities, which may take months or even years. In the case of oil and gas, the exploration and surveying, the drilling of wells, which may be failures, and the final successful drilling of a producing well with the necessary pipeline connections to refineries, again may take a number of years.

Whether we can maintain a level of energy production adequate to sustain our level of living and national security would seem to depend primarily on three factors: (1) The size of the reserves; (2) the rate and the efficiency of extraction; (3) the rate and efficiency of utilization.

### 1. SIZE OF RESERVES

The most remarkable fact about our national fuel reserves is the limited amount of accurate and detailed knowledge available about them. Until this year, for instance, the available information about

coal reserves was based on estimates which were prepared in the 1920's. In 1948 the United States Geological Survey began a 10-year reappraisal program. On the basis of the first of these new State-by-State studies it is already known that the earlier estimates will have to be scaled down appreciably. That is a significant change in basic energy data. How incomplete even the new revisions are is illustrated by a recent Geological Survey report on the coal resources of the State of Wyoming. This report covers only 47 percent of that area of the State which is known to contain coal. The remaining 53 percent of the State's known coal-bearing area is too inadequately mapped and surveyed to permit any adequate evaluation of its coal reserves. That is a woeful state of ignorance concerning one of our most important natural resources. And coal reserves, compared with those of gas and oil, at least are relatively stable. Immobile and in solid layers, coal reserves are relatively amenable to measurement and appraisal. As geologic knowledge improves and the mapping and surveying of the Nation proceeds, we will approach a more realistic estimate of our coal reserves.

In the case of oil and gas the situation is similar. The exactness of the estimates of basic reserves has been questioned. Because of our increasing reliance on oil and gaseous fuel and because reserves of oil and gas are small as compared to reserves of coal, more attention focuses on oil and gas reserves. The reserves commonly cited are the estimates of the so-called proved reserves, an ever-changing quantity dependent on new discoveries, consumption, and technological developments in the science of reservoir behavior. Annual estimates of proved reserves are prepared by industry, not by Federal agencies. Proved reserves may increase or decrease depending on the results of new discoveries, revisions of earlier estimates, extension of old pools, secondary recovery, and the elimination of waste above and below the surface. Fortunately for the Nation, proved reserves have shown a steady increase. In view of the obvious importance of information on reserves, it is essential to know what studies should be undertaken to determine more accurately, if possible, the actual extent of the reserves of petroleum and natural gas.

Information on reserves of hydropower, i. e., potential hydrogenerating capacity, is in relatively good shape. The Federal Power Commission, in cooperation with other Government agencies, has undertaken Nation-wide surveys of hydrological and related data which, compared with information on mineral reserves, are more complete and appear to be subject to only minor controversy.

### 2. RATE AND EFFICIENCY OF EXTRACTION

Both the rate and the efficiency of extraction of fuel resources depend upon a variety of technologic and economic factors. Recovery techniques and equipment largely determine the ceiling on the rate of production. As to the actual rate of production of exhaustible resources, however, it is proper to consider what rate of production will best promote the economic development of the Nation and at the same time maintain the security of the Nation. In the case of coal, the rate of extraction, because of inherent technical limits, is not so important as the methods of production. Much coal has been wasted in the past by inefficient mining practices which left coal underground

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incapable of later production, or which permitted the encroachment of water or the possibility of cave-ins.

Although both industry and Government have made great strides in improving mining practices, some estimates place coal lost in mining at fully the same amount as that which is produced. Since the end of high-grade coal deposits, especially in the industrial East, is definitely in sight, although not imminent, efficient mining practices become of increasing importance.

The rate of production of oil and gas is of great importance because the amount produced can be changed by the mere turning of a valve and because a changed rate of production immediately and directly affects the total recoverable reserve. With respect to efficiency of extraction of gas and oil, it is true that oil is no longer permitted to escape in great gushers or to spill on the ground, and gas is no longer flared in fantastic volume. Much less oil is left underground with our present method of recovery and the bulk of gas is recovered for consumption. But even today, competent experts advise, easily one-third of the oil in a pool cannot be extracted by present methods of production. Control of reservoir energy and secondary recovery methods are contributing to the elimination of this waste.

Too little is known about the so-called maximum efficient rate of production, i. e., that rate of production which will produce the maximum amount of oil or gas over the entire life span of a reservoir. The intricate technical factors, arising primarily out of the characteristics of the individual field, are as yet imperfectly understood. Until these factors are better understood the Nation's productive capacity cannot be determined with accuracy. While industry and Government have cooperated in trying to arrive at more exact measurement of the factors which determine the most efficient level of production for oil and gas. This is a subject which will require much intensive study.

On the economic side, the rate of efficiency of production depends on a multitude of factors, such as pattern of surface ownership, financial and structural organization of the producer and price of fuels. In the case of oil, State production controls, where they are enforced, set a limit on the rate of production. In the case of gas, the availability of pipelines or other purchasers of gas determine the output. While the operation of some of these economic forces in their impact on fuel production is understood, much remains to be discovered of the interrelationships of these economic trends.

### 3. RATE AND EFFICIENCY OF UTILIZATION

Consumption patterns of fuels result not only from the demand for each individual fuel but also from economic conditions in the various fuel-consuming industries and the demand for the products of those industries. Among factors that shape consumption patterns are new consuming devices, growth and shift of population, price of fuels and of fuel-using equipment, restraints on and incentives to consumption of some particular fuel, and efficiency and economy of fuel-using equipment. These factors do not exert the same influence on all segments of the fuel consumption economy. Far too little is known about the individual and group decisions which make up the total pattern. The devices which measure the end results, although imperfect, do at times provide some indication of the over-all trend. For instance, enough

information is available to show that in the year 1948, coal (both bituminous and anthracite) for the first time in the past century, furnished less than one-half of all energy consumed. This information is dramatic to the statistician, but it means little to the average citizen until he looks behind the mathematical computations. What does this turning point in the Nation's fuel history mean? What are the social and economic implications?

In order to find the more significant aspects of the fuel-consuming trends, it is necessary to divide the energy economy into two parts: (1) The area of fuel consumption in which only one particular type of fuel will fulfill the consuming need; and (2) the area of interfuel competition—in which the consumer can and will readily substitute one source of energy for another.

In the first area certain trends are quite apparent. The record production and registration of motor vehicles means increased dependence on gasoline and diesel fuel. The expanding use of tractors on farms, again a consumer of liquid fuel, also requires largely gasoline and diesel fuel. The sustained high and expanding level of steel production requires fixed and growing amounts of metallurgical coking coal. Various industrial processes, primarily chemical processes, which are gaining in importance, depend on the availability of large quantities of natural gas. The rapid development of and shift to electro-process industries call for greater amounts of low-cost electric power.

Past trends in this area of fuel consumption are relatively susceptible to projections which may serve as guide to the future. Changes do occur both in the technique and efficiency of consumption and in the underlying economic conditions, but they usually occur over a time span sufficient to permit gradual adjustment.

In the area of vigorous interfuel competition predictions are much more hazardous. Individual choice, a fractional change in price, or the appearance of a new gadget can produce quick shifts in demand from one source of fuel to another. Normally, major trends develop slowly, but sudden swerves in demand can cause at least temporary upset to the fuel balance. For example, it takes only several days or weeks to convert a furnace in a home or factory from one fuel to another. And when a large number of consumers shift in the same direction it must necessarily cause at least temporary dislocations until adjustment to the new consumption pattern can be made. The bituminous coal industry has borne the brunt of this experience during the course of the last several years. The anthracite coal industry has found itself the victim of a much longer-term trend over the past half century.

On the other hand, some shifts in fuel consumption give notice over a period of time in advance of the actual change-over. In the case of dieselization of railroads, the time required to produce one diesel engine—perhaps a year or two—will give notice of increased diesel fuel consumption and of reduced coal consumption, assuming that the diesel engine is to replace a coal-burner.

The changing patterns of fuel consumption are of interest to statisticians, but seem to be of no particular importance to the public when sufficient quantities of all energy sources are available. Yet when coal mines shut down in wide areas, when the men in the mines and on the coal-carrying railroads lose their jobs, then public concern arises.

These trends illustrate the intimate interrelationship of the energy industries. The size of oil imports, for instance, affects not merely the petroleum industry but, depending upon the type of oil imported, may affect coal mines and coal-carrying railroads. The importation of natural gas to the industrial Northeast affects more than the demand for manufactured gas. A substantial portion of manufactured gas is produced in byproducts coke ovens whose primary output is metallurgical coke for blast furnaces of the steel industry. A shift to the use of natural gas would result in a loss of market for the byproduct manufactured gas, and except for possible basic technological developments, would seriously affect the supply, or at least the price, of coke to the steel industry. The unavailability of sources of cheap hydro power for the expansion of the aluminum industry is providing a new large-scale customer for natural gas.

These trends have developed as a result of economic and technological factors operating in the private enterprise economy and not as a result of government planning by Federal, State, or local authorities.

Among the determinants of the future availability of fuels is the efficiency of fuel utilization. A comparison of fuel consumption with total economic activity, for instance—that is, with gross national product—indicates that the amount of energy produced—and imported—per unit of national product has declined steadily during this century. Per capita consumption of energy has continued upward. At the same time the population has grown. Taken together, these facts suggest that there has been an over-all increase in fuel-consuming efficiency. Where have these efficiency improvements been most notable? In which segments of fuel consumption is there most opportunity for progress? What will be the effect on total requirements? These are questions to which answers are available in only very sketchy form. It is well known that the coal-fired steam locomotive is fabulously inefficient under normal operating conditions. Today's automobiles cannot utilize more than 30 percent at best of the gasoline-energy input. Improperly constructed and insulated homes permit large amounts of heat to escape at considerable expense to the homeowner. Industry and Government have cooperated in research in some of these areas to improve the efficiency of energy consumption. Construction and furnaces are being improved. The auto industry is working on more efficient combustion engines. The electric utilities, especially, for whom fuel constitutes one-third of operating costs, have greatly improved their boiler efficiencies. In this last instance, the fuel consumer has not only the financial interest but also the financial resources to invest in the necessary research. The motorist and the home owner cannot contribute similarly. They can merely improve individual efficiency by holding down the speed of the car or installing weatherstripping. Improvement of efficiency is one field in which it is possible to stretch the supply of fuel further without depriving anyone.

Whether any degree of interference with the energy economy will be necessary in the future—outside of direct military situations—will necessarily depend on the continued availability of sufficient quantities of energy sources to permit the steady expansion of the economy and the fulfilment of commitments to other nations without causing major dislocations. It is important that sufficient information be

available to permit anticipation of the fuel supply problems which may arise. To deal piecemeal with individual maladjustments in segments of the energy economy without knowledge of their relationship to the whole picture is not an effective method of approaching so basic a part of our national life.

This study of our energy economy is designed to provide the necessary information to permit adequate, integrated solution both to specific temporary imbalances and to the total problem. No attempt is made to prejudge any possible conclusions to which this study may lead. The only statement that can be made with finality at this point is that we face a large area of ignorance about our energy resources and the efficiency of their utilization. The industries affected, the people whose capital and labor are employed in them, the people whose industrial and social progress depend upon their efficient production and distribution, and finally, the Congress with its responsibility to the people all stand in need of better information. Government must know where the Nation stands. It must be able to judge whether the recurrent claims that our fuel resources are vanishing rapidly are based on substantial evidence or whether they are merely alarmist cries of partisan advocates.

The Federal Government has responsibility in some phases of energy development, while the States exercise control in other phases. In still others the counties and municipalities have jurisdiction. Private enterprise makes the sole determination in the remaining large areas of energy activities. Do present Federal, State, and local laws and regulations promote the public interest in the wise development of our natural resources? Do we even know in specific terms what the public interest is when it comes to technical problems?

Answers must be found for these questions and information must be developed that will permit the formulation of policies designed to increase the availability of reliable energy resources by drawing more heavily on those which are inexhaustible, such as water, wind, and the sun; by improving the methods of producing exhaustible resources; and by encouraging the more efficient consumption of energy—all to the end that the American people may have the assurance that their energy resources will not be dealt with so improvidently as to limit the ever higher and higher level of living possible with our national genius and our wealth of resources.

# CHAPTER I

# ENERGY CONSUMPTION

## I. Total Domestic Energy Consumption

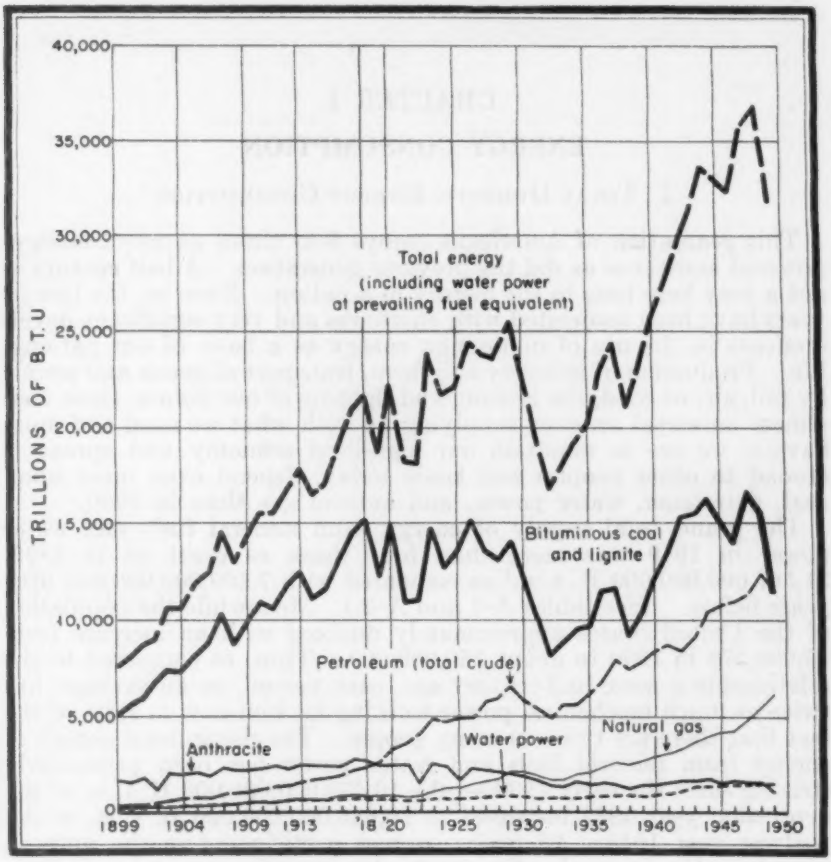
This generation of Americans enjoys four times as much energy-powered assistance as did the previous generation. A half century is not a very long time in the history of a nation. Even so, the last 50 years have been associated with enormous and very significant developments in the use of nonhuman energy as a basis of our national life. Production of industry and farm, transport of goods and people by rail, air, or road, the heating and lighting of our homes, these vast almost universal services supplying us with what we need and must have if we are to maintain our high-level economy and spread it abroad to other peoples and lands today, depend even more upon coal, petroleum, water power, and natural gas than in 1900.

The grand total supply of energy from mineral fuels and water power in 1949 was more than four times as great as in 1899, 31,567,000,000,000 B. t. u.[1] as compared with 7,409,000,000,000 fifty years before. (See tables A–1 and A–2.) Meanwhile the population of the United States approximately doubled with an increase from 75,994,575 in 1900 to about 150,000,000. Thus, as compared to the relationship a mere half century ago, each person, on an average, has twice as much mechanical power working for him now in spite of the fact that there are twice as many people. The rise in total supply of energy from mineral fuels and water power has been particularly striking since the early 1930's—the 16,579,000,000,000 B. t. u. of the depression year 1932 increased to 36,635,000,000,000 B. t. u. in the postwar year 1948. All major sources participated in the uptrend except anthracite coal. For it the trend during most years since World War I has been generally downward, falling in 1949 to an index of 43 as compared to 100 in 1918 and 61 in 1899.

Bituminous coal has participated to a smaller extent comparatively in the upward trend than other mineral fuels. Though it had a very substantial absolute rise from the 1932 low level, even the peak of the demand stimulated by World War II did not greatly exceed the general level reached during World War I and in the 1920's. The 1918 level of 15,180,000,000,000 B. t. u. was almost reached in 1926 (15,022,000,000,000 B. t. u.) after which the level dropped nearly 50 percent—to 8,114,000,000,000 in 1932; several years in the 1940's stood at slightly above the 1926 level with 1947 providing a peak of 16,522,000,000,000 B. t. u. On an index (1918=100) the 1899 level was 33 whereas the levels achieved during or after World War II did not rise as much as 10 points above 1918.

[1] The B. t. u. or British thermal unit, is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at or near its point of maximum density (39.1° F.). This equals 0.252 calories.

FIGURE A–1.—ANNUAL SUPPLY OF ENERGY FROM MINERAL FUELS AND WATER POWER IN THE UNITED STATES, 1899–1949.




Source: U. S. Bureau of Mines.

TABLE A.—1 *Annual supply of energy from mineral fuels and water power in the United States, 1889 and 1899–1949, in trillions of British thermal units* [1]

| Year | Pennsylvania anthracite | Bituminous coal and lignite | Total coal | Petroleum (total crude) | | Natural gas (marketed production) | Total petroleum and natural gas | Total mineral fuels | Water power [2] | Grand total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Domestic production | Imports | | | | | |
| 1889 | 1,157 | 2,507 | 3,664 | 204 | ..... | 268 | 472 | 4,136 | ([3]) | ([3]) |
| 1899 | 1,535 | 5,065 | 6,600 | 331 | ..... | 240 | 571 | 7,171 | 238 | 7,409 |
| 1900 | 1,457 | 5,563 | 7,020 | 369 | ..... | 254 | 623 | 7,643 | 250 | 7,893 |
| 1901 | 1,714 | 5,917 | 7,631 | 402 | ..... | 283 | 685 | 8,316 | 264 | 8,580 |
| 1902 | 1,051 | 6,818 | 7,869 | 515 | ..... | 301 | 816 | 8,685 | 289 | 8,974 |
| 1903 | 1,895 | 7,408 | 9,303 | 583 | ..... | 319 | 902 | 10,205 | 321 | 10,526 |
| 1904 | 1,858 | 7,301 | 9,159 | 679 | ..... | 333 | 1,012 | 10,171 | 354 | 10,525 |
| 1905 | 1,973 | 8,255 | 10,228 | 781 | ..... | 377 | 1,158 | 11,386 | 386 | 11,772 |
| 1906 | 1,811 | 8,983 | 10,794 | 734 | ..... | 418 | 1,152 | 11,946 | 414 | 12,360 |
| 1907 | 2,174 | 10,343 | 12,517 | 963 | ..... | 437 | 1,400 | 13,917 | 441 | 14,358 |
| 1908 | 2,115 | 8,713 | 10,828 | 1,035 | ..... | 432 | 1,467 | 12,295 | 476 | 12,771 |
| 1909 | 2,059 | 9,949 | 12,008 | 1,062 | ..... | 517 | 1,579 | 13,587 | 513 | 14,100 |
| 1910 | 2,146 | 10,928 | 13,074 | 1,215 | 3 | 547 | 1,765 | 14,839 | 539 | 15,378 |
| 1911 | 2,298 | 10,635 | 12,933 | 1,279 | 8 | 551 | 1,838 | 14,771 | 565 | 15,336 |
| 1912 | 2,143 | 11,793 | 13,936 | 1,293 | 40 | 604 | 1,937 | 15,873 | 585 | 16,458 |
| 1913 | 2,325 | 12,535 | 14,860 | 1,441 | 98 | 626 | 2,165 | 17,025 | 609 | 17,634 |
| 1914 | 2,307 | 11,075 | 13,382 | 1,541 | 98 | 636 | 2,275 | 15,657 | 636 | 16,293 |
| 1915 | 2,260 | 11,597 | 13,857 | 1,630 | 105 | 676 | 2,411 | 16,268 | 659 | 16,927 |
| 1916 | 2,224 | 13,166 | 15,390 | 1,744 | 121 | 810 | 2,675 | 18,065 | 681 | 18,746 |
| 1917 | 2,530 | 14,457 | 16,987 | 1,945 | 175 | 855 | 2,975 | 19,962 | 700 | 20,662 |
| 1918 | 2,510 | 15,180 | 17,690 | 2,064 | 219 | 775 | 3,058 | 20,748 | 701 | 21,449 |
| 1919 | 2,238 | 12,206 | 14,444 | 2,195 | 306 | 802 | 3,303 | 17,747 | 718 | 18,465 |
| 1920 | 2,276 | 14,899 | 17,175 | 2,569 | 616 | 858 | 4,043 | 21,218 | 738 | 21,956 |
| 1921 | 2,298 | 10,897 | 13,195 | 2,739 | 727 | 712 | 4,178 | 17,373 | 620 | 17,993 |
| 1922 | 1,389 | 11,063 | 12,452 | 3,234 | 738 | 820 | 4,792 | 17,244 | 643 | 17,887 |
| 1923 | 2,371 | 14,792 | 17,163 | 4,248 | 476 | 1,083 | 5,807 | 22,970 | 685 | 23,655 |
| 1924 | 2,233 | 12,672 | 14,905 | 4,141 | 451 | 1,228 | 5,820 | 20,725 | 648 | 21,373 |
| 1925 | 1,570 | 13,625 | 15,195 | 4,430 | 359 | 1,278 | 6,067 | 21,262 | 668 | 21,930 |
| 1926 | 2,145 | 15,022 | 17,167 | 4,471 | 350 | 1,411 | 6,232 | 23,399 | 728 | 24,127 |
| 1927 | 2,034 | 13,565 | 15,599 | 5,227 | 339 | 1,553 | 7,119 | 22,718 | 776 | 23,494 |
| 1928 | 1,914 | 13,120 | 15,034 | 5,229 | 463 | 1,686 | 7,378 | 22,412 | 854 | 23,266 |
| 1929 | 1,875 | 14,017 | 15,892 | 5,842 | 458 | 2,062 | 8,362 | 24,254 | 816 | 25,070 |
| 1930 | 1,762 | 12,249 | 14,011 | 5,208 | 360 | 2,089 | 7,657 | 21,668 | 752 | 22,420 |
| 1931 | 1,515 | 10,011 | 11,526 | 4,936 | 274 | 1,813 | 7,023 | 18,549 | 668 | 19,217 |
| 1932 | 1,266 | 8,114 | 9,380 | 4,554 | 259 | 1,673 | 6,486 | 15,866 | 713 | 16,579 |
| 1933 | 1,258 | 8,741 | 9,999 | 5,253 | 185 | 1,672 | 7,110 | 17,109 | 711 | 17,820 |
| 1934 | 1,452 | 9,415 | 10,867 | 5,267 | 206 | 1,904 | 7,377 | 18,244 | 698 | 18,942 |
| 1935 | 1,325 | 9,756 | 11,081 | 5,780 | 187 | 2,060 | 8,027 | 19,108 | 806 | 19,914 |
| 1936 | 1,386 | 11,504 | 12,890 | 6,378 | 187 | 2,330 | 8,895 | 21,785 | 812 | 22,597 |
| 1937 | 1,317 | 11,673 | 12,990 | 7,419 | 159 | 2,588 | 10,166 | 23,156 | 871 | 24,027 |
| 1938 | 1,171 | 9,132 | 10,303 | 7,043 | 153 | 2,468 | 9,664 | 19,967 | 866 | 20,833 |
| 1939 | 1,308 | 10,345 | 11,653 | 7,337 | 192 | 2,663 | 10,192 | 21,845 | 838 | 22,683 |
| 1940 | 1,308 | 12,072 | 13,380 | 7,849 | 247 | 2,860 | 10,956 | 24,336 | 880 | 25,216 |
| 1941 | 1,432 | 13,471 | 14,903 | 8,133 | 294 | 3,024 | 11,451 | 26,354 | 934 | 27,288 |
| 1942 | 1,532 | 15,267 | 16,799 | 8,043 | 71 | 3,282 | 11,396 | 28,195 | 1,136 | 29,331 |
| 1943 | 1,540 | 15,463 | 17,003 | 8,733 | 80 | 3,671 | 12,484 | 29,487 | 1,304 | 30,791 |
| 1944 | 1,618 | 16,233 | 17,851 | 9,732 | 260 | 3,989 | 13,981 | 31,832 | 1,344 | 33,176 |
| 1945 | 1,395 | 15,134 | 16,529 | 9,939 | 429 | 4,213 | 14,581 | 31,110 | 1,442 | 32,552 |
| 1946 | 1,537 | 13,989 | 15,526 | 10,057 | 517 | 4,333 | 14,907 | 30,433 | 1,406 | 31,839 |
| 1947 | 1,453 | 16,522 | 17,975 | 10,771 | 576 | 4,926 | 16,273 | 34,248 | 1,426 | 35,674 |
| 1948 [4] | 1,451 | 15,707 | 17,158 | 11,717 | 745 | 5,534 | 17,996 | 35,154 | 1,481 | 36,635 |
| 1949 [4] | 1,085 | 11,472 | 12,557 | 10,674 | 898 | 5,899 | 17,471 | 30,028 | 1,539 | 31,567 |

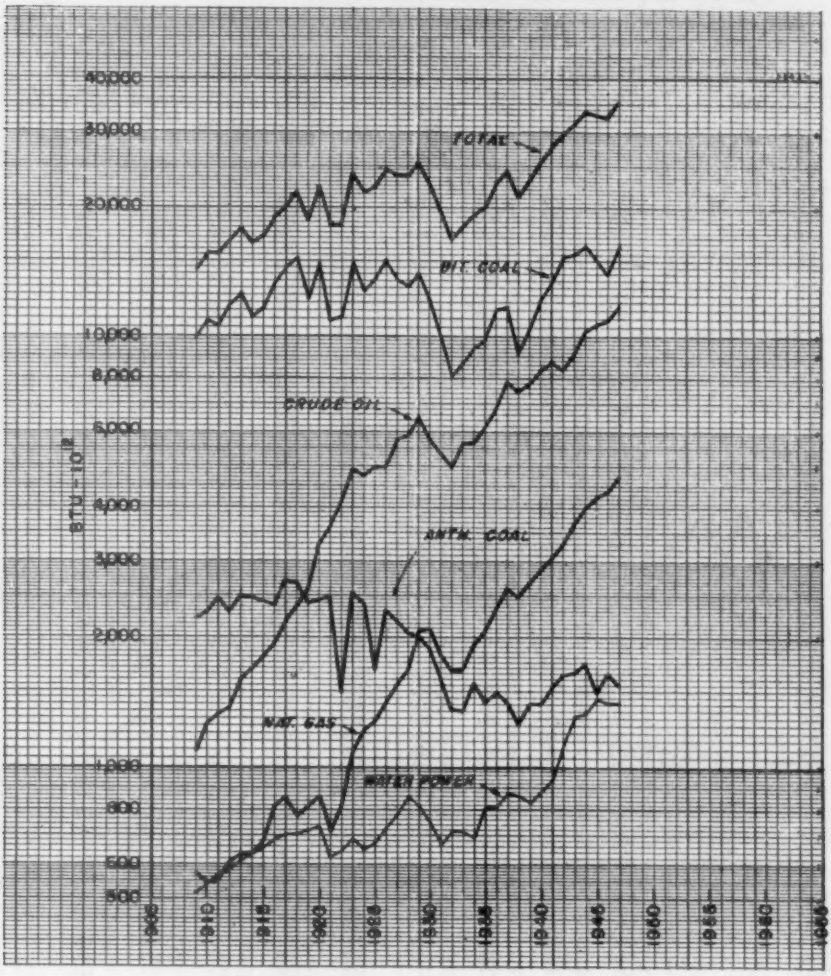
[1] The unit heat values employed are: Anthracite, 12,700 B. t. u. per pound; bituminous coal and lignite, 13,100 B. t. u. per pound; petroleum 5,800,000 B. t. u. per barrel; natural gas, 1,075 B. t. u. per cubic foot. Water power includes installations owned by manufacturing plants and mines, as well as Government and privately owned public utilities. The fuel equivalent of water power is calculated from the kilowatt-hours of power produced wherever available, as it is true of all public-utility plants since 1919. Otherwise, the fuel equivalent is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 percent for manufacturers and mines and of 40 percent for public utilities.

[2] Fuel equivalent calculated by assuming the average central-station practice for each of the years for which data are available.

[3] Data not available.

[4] Subject to revision.

FIGURE A–2.—ENERGY PRODUCED AND IMPORTED, BY PRIMARY SOURCES.




Source: Bureau of Mines Circular No. 7582.

TABLE A–2.—*Index numbers for relative rate of growth of coal, oil, and water power in the United States, 1889 and 1899–1949*

[1918=100]

| Year | Pennsylvania anthracite | Bituminous coal and lignite | Total coal | Petroleum (crude) | | Natural gas (marketed production) | Total petroleum and natural gas | Total mineral fuels | Water power | Grand total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Domestic production | Imports | | | | | |
| 1889 | 46 | 17 | 21 | 10 | ---------- | 35 | 15 | 20 | [1] | [1] |
| 1899 | 61 | 33 | 37 | 16 | ---------- | 31 | 19 | 35 | 34 | 35 |
| 1900 | 58 | 37 | 40 | 18 | ---------- | 33 | 20 | 37 | 36 | 37 |
| 1901 | 68 | 39 | 43 | 19 | ---------- | 37 | 22 | 40 | 38 | 40 |
| 1902 | 42 | 45 | 44 | 25 | ---------- | 39 | 27 | 42 | 41 | 42 |
| 1903 | 75 | 49 | 53 | 28 | ---------- | 41 | 29 | 49 | 46 | 49 |
| 1904 | 74 | 48 | 52 | 33 | ---------- | 43 | 33 | 49 | 50 | 49 |
| 1905 | 79 | 54 | 58 | 38 | ---------- | 49 | 38 | 55 | 55 | 55 |
| 1906 | 72 | 59 | 61 | 36 | ---------- | 54 | 38 | 58 | 59 | 58 |
| 1907 | 87 | 68 | 71 | 47 | ---------- | 56 | 46 | 67 | 63 | 67 |
| 1908 | 84 | 57 | 61 | 50 | ---------- | 56 | 48 | 59 | 68 | 60 |
| 1909 | 82 | 66 | 68 | 51 | ---------- | 67 | 52 | 65 | 73 | 66 |
| 1910 | 85 | 72 | 74 | 59 | 1 | 71 | 58 | 72 | 77 | 72 |
| 1911 | 92 | 70 | 73 | 62 | 4 | 71 | 60 | 71 | 81 | 71 |
| 1912 | 85 | 78 | 79 | 63 | 18 | 78 | 63 | 77 | 83 | 77 |
| 1913 | 93 | 83 | 84 | 70 | 45 | 81 | 71 | 82 | 87 | 82 |
| 1914 | 92 | 73 | 76 | 75 | 45 | 82 | 74 | 75 | 91 | 76 |
| 1915 | 90 | 76 | 78 | 79 | 48 | 87 | 79 | 78 | 94 | 79 |
| 1916 | 89 | 87 | 87 | 84 | 55 | 105 | 87 | 87 | 97 | 87 |
| 1917 | 101 | 95 | 96 | 94 | 80 | 110 | 97 | 96 | 100 | 96 |
| 1918 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1919 | 89 | 80 | 82 | 106 | 140 | 103 | 108 | 86 | 102 | 86 |
| 1920 | 91 | 98 | 97 | 124 | 281 | 111 | 132 | 102 | 105 | 102 |
| 1921 | 92 | 72 | 75 | 133 | 332 | 92 | 137 | 84 | 88 | 84 |
| 1922 | 55 | 73 | 70 | 157 | 337 | 106 | 157 | 83 | 92 | 83 |
| 1923 | 94 | 97 | 97 | 206 | 217 | 140 | 190 | 111 | 98 | 110 |
| 1924 | 89 | 83 | 84 | 201 | 206 | 158 | 190 | 100 | 92 | 100 |
| 1925 | 63 | 90 | 86 | 215 | 164 | 165 | 198 | 102 | 95 | 102 |
| 1926 | 85 | 99 | 97 | 217 | 160 | 182 | 204 | 113 | 104 | 112 |
| 1927 | 81 | 89 | 88 | 253 | 155 | 201 | 233 | 109 | 111 | 110 |
| 1928 | 76 | 86 | 85 | 253 | 211 | 218 | 241 | 108 | 122 | 108 |
| 1929 | 75 | 92 | 90 | 283 | 209 | 266 | 273 | 117 | 116 | 117 |
| 1930 | 70 | 81 | 79 | 252 | 164 | 270 | 250 | 104 | 107 | 105 |
| 1931 | 60 | 66 | 65 | 239 | 125 | 234 | 230 | 89 | 95 | 90 |
| 1932 | 50 | 53 | 53 | 221 | 118 | 216 | 212 | 77 | 102 | 77 |
| 1933 | 50 | 57 | 57 | 255 | 84 | 216 | 233 | 82 | 101 | 83 |
| 1934 | 58 | 62 | 61 | 255 | 94 | 246 | 241 | 88 | 100 | 88 |
| 1935 | 53 | 64 | 63 | 280 | 85 | 266 | 262 | 92 | 115 | 93 |
| 1936 | 55 | 76 | 73 | 309 | 85 | 301 | 291 | 105 | 116 | 105 |
| 1937 | 52 | 77 | 73 | 359 | 73 | 334 | 332 | 112 | 124 | 112 |
| 1938 | 47 | 60 | 58 | 341 | 70 | 318 | 316 | 96 | 124 | 97 |
| 1939 | 52 | 68 | 66 | 355 | 88 | 344 | 333 | 105 | 120 | 106 |
| 1940 | 52 | 80 | 76 | 380 | 113 | 369 | 358 | 117 | 126 | 118 |
| 1941 | 57 | 89 | 84 | 394 | 134 | 390 | 374 | 127 | 133 | 127 |
| 1942 | 61 | 101 | 95 | 390 | 32 | 423 | 373 | 136 | 162 | 137 |
| 1943 | 61 | 102 | 96 | 423 | 37 | 474 | 408 | 142 | 186 | 144 |
| 1944 | 64 | 107 | 101 | 472 | 119 | 515 | 457 | 153 | 192 | 155 |
| 1945 | 56 | 100 | 93 | 482 | 196 | 544 | 477 | 150 | 206 | 152 |
| 1946 | 61 | 92 | 88 | 487 | 236 | 559 | 487 | 147 | 201 | 148 |
| 1947 | 58 | 109 | 102 | 522 | 263 | 636 | 532 | 165 | 203 | 166 |
| 1948 [2] | 58 | 103 | 97 | 568 | 340 | 714 | 588 | 169 | 201 | 171 |
| 1949 [2] | 43 | 76 | 71 | 517 | 410 | 761 | 571 | 145 | 220 | 147 |

[1] Data not available.
[2] Preliminary figures.

Source: Minerals Yearbook, 1946, Bureau of Mines.

Petroleum, as measured by total crude, has had a rather even upward trend since the early part of the century, without as pronounced a slump as that which overtook bituminous coal in the 1930's and with the peak supply of 1948 (11,717,000,000,000 B. t. u.) approximately twice as large as the predepression peak of 1929 (5,842,000,000,000 B. t. u.).

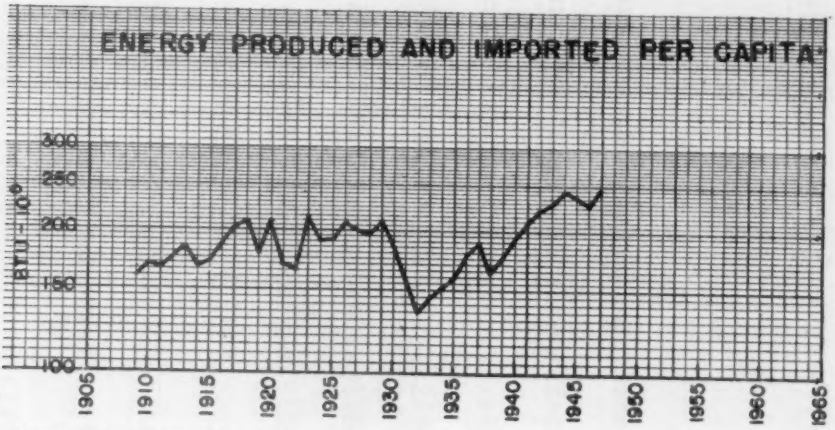
Natural gas has come into large-scale prominence only since the 1920's. Marketed production reached a temporary peak in 1930 of 2,089,000,000,000 B. t. u. which was surpassed as early as 1936. By 1949 the supply of 5,899,000,000,000 B. t. u. was approximately 3 times as large as the 1930 peak. On an index (1918=100) the level in 1899 was only 35, whereas in 1949 it was 761.

Water power had a steady gradual increase from the beginning of the century (238,000,000,000 B. t. u.) until the late 1930's (less than 900,000,000,000 B. t. u.) but expansion during the 1940's increased the total to 1,539,000,000,000 B. t. u. in 1949. The index rose from 34 in 1899 (1918=100), in 120 in 1939, and to 220 in 1949.

The differential rates of progress in production from the several sources including imports is clearly visible on the semilogarithmic chart (Fig. A–2). Parallel growth in the related sources of crude oil and natural gas is striking. The sharp rise in water power as a source after 1940 is emphasized.

On a per capita basis, the increase in produced and imported energy, though showing a sharp recovery after 1932 and reaching new levels in the 1940's, nevertheless did not soon exceed the general peak levels attained several times during the period 1918–30.

FIGURE A–3.



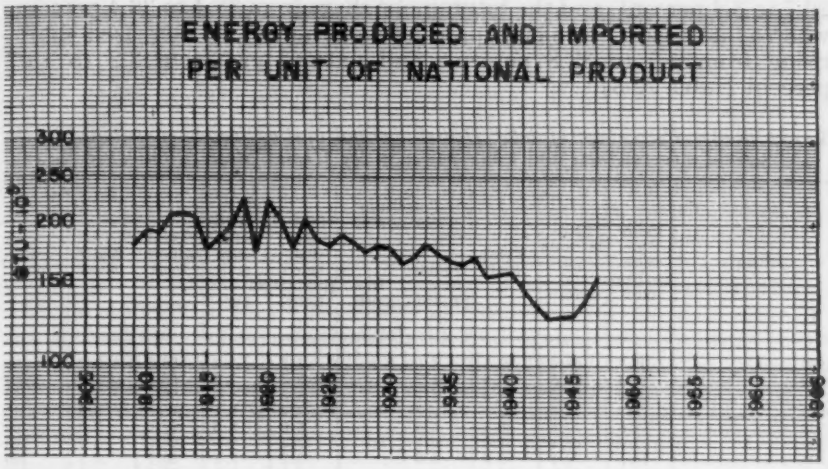

Source: Bureau of Mines Circular No. 7582.

The general and long-continued tendency for available energy to be used more efficiently, for mechanical power to result in larger output per unit application, is illustrated in figure A–4. This general trend apparently accelerated in the early 1940's, but later rather sharply reversed itself.

## SHARES CONTRIBUTED BY ALL SOURCES

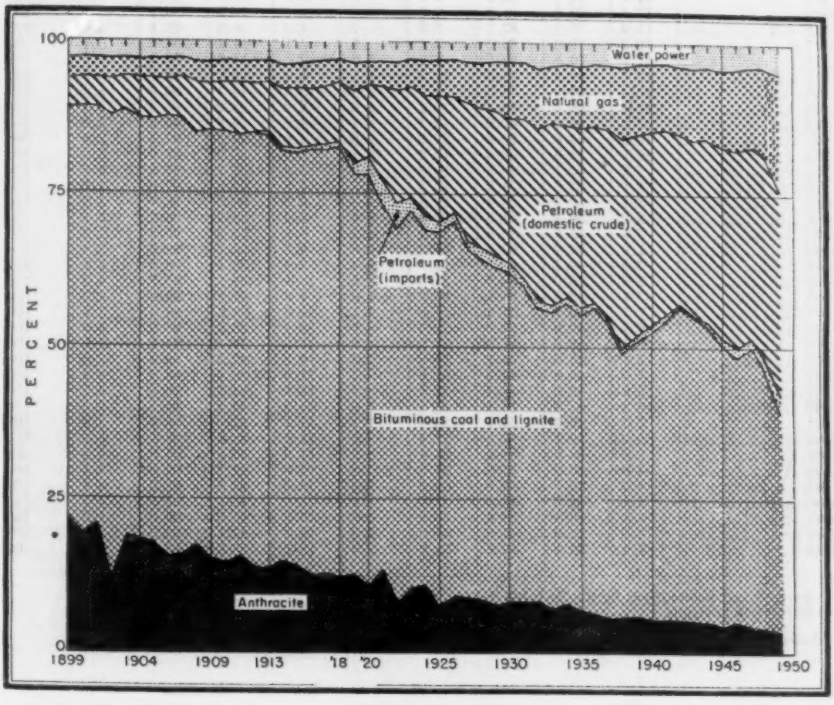
The declining shares of anthracite and bituminous coal in the total energy picture, the nearly constant share held by water power and the much increased shares of natural gas and petroleum during the 50-year period 1899–1949 are charted in figure A–5. Petroleum imports have continued to be a very small though fluctuating part of the total.

FIGURE A–4.




Source: Bureau of Mines Circular No. 7582.

FIGURE A–5.—PERCENTAGE OF TOTAL B. T. U. EQUIVALENT CONTRIBUTED BY THE SEVERAL MINERAL FUELS AND WATER POWER IN THE UNITED STATES, 1899–1949.




Source: Bureau of Mines.

Percentagewise, the anthracite share of the total dropped from 20.7 to 3.4 percent, and the bituminous share from 68.4 to 36.4 percent, whereas domestic petroleum production achieved an increased share, rising from 4.5 to 33.8 percent, and natural gas from 3.2 to 18.7 percent (table A–3).

TABLE A–3.—*Percentage of total British thermal unit equivalent contributed by the several mineral fuels and water power in the United States, 1899–1949* [1]

| Year | Pennsylvania anthracite | Bituminous coal and lignite | Total coal | Petroleum (total crude) | | Natural gas (marketed productions) | Total petroleum and natural gas | Total mineral fuels | Water power | Grand total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Domestic production | Imports | | | | | |
| 1899 | 20.7 | 68.4 | 89.1 | 4.5 | ..... | 3.2 | 7.7 | 96.8 | 3.2 | 100 |
| 1900 | 18.4 | 70.5 | 88.9 | 4.7 | ..... | 3.2 | 7.9 | 96.8 | 3.2 | 100 |
| 1901 | 20.0 | 68.9 | 88.9 | 4.7 | ..... | 3.3 | 8.0 | 96.9 | 3.1 | 100 |
| 1902 | 11.7 | 76.0 | 87.7 | 5.7 | ..... | 3.4 | 9.1 | 96.8 | 3.2 | 100 |
| 1903 | 18.0 | 70.4 | 88.4 | 5.6 | ..... | 3.0 | 8.6 | 97.0 | 3.0 | 100 |
| 1904 | 17.6 | 69.4 | 87.0 | 6.4 | ..... | 3.2 | 9.6 | 96.6 | 3.4 | 100 |
| 1905 | 16.8 | 70.1 | 86.9 | 6.6 | ..... | 3.2 | 9.8 | 96.7 | 3.3 | 100 |
| 1906 | 14.7 | 72.7 | 87.4 | 5.9 | ..... | 3.4 | 9.3 | 96.7 | 3.3 | 100 |
| 1907 | 15.2 | 72.0 | 87.2 | 6.7 | ..... | 3.0 | 9.7 | 96.9 | 3.1 | 100 |
| 1908 | 16.6 | 68.2 | 84.8 | 8.1 | ..... | 3.4 | 11.5 | 96.3 | 3.7 | 100 |
| 1909 | 14.6 | 70.6 | 85.2 | 7.5 | ..... | 3.7 | 11.2 | 96.4 | 3.6 | 100 |
| 1910 | 13.9 | 71.1 | 85.0 | 7.9 | ..... | 3.6 | 11.5 | 96.5 | 3.5 | 100 |
| 1911 | 15.0 | 69.3 | 84.3 | 8.3 | 0.1 | 3.6 | 12.0 | 96.3 | 3.7 | 100 |
| 1912 | 13.0 | 71.7 | 84.7 | 7.8 | .2 | 3.7 | 11.7 | 96.4 | 3.6 | 100 |
| 1913 | 13.2 | 71.0 | 84.2 | 8.2 | .6 | 3.5 | 12.3 | 96.5 | 3.5 | 100 |
| 1914 | 14.1 | 68.0 | 82.1 | 9.5 | .6 | 3.9 | 14.0 | 96.1 | 3.9 | 100 |
| 1915 | 13.4 | 68.5 | 81.9 | 9.6 | .6 | 4.0 | 14.2 | 96.1 | 3.9 | 100 |
| 1916 | 11.9 | 70.2 | 82.1 | 9.3 | .7 | 4.3 | 14.3 | 96.4 | 3.6 | 100 |
| 1917 | 12.2 | 70.0 | 82.2 | 9.4 | .9 | 4.1 | 14.4 | 96.6 | 3.4 | 100 |
| 1918 | 11.7 | 70.8 | 82.5 | 9.6 | 1.0 | 3.6 | 14.2 | 96.7 | 3.3 | 100 |
| 1919 | 12.1 | 66.1 | 78.2 | 11.9 | 1.7 | 4.3 | 17.9 | 96.1 | 3.9 | 100 |
| 1920 | 10.4 | 67.8 | 78.2 | 11.7 | 2.8 | 3.9 | 18.4 | 96.6 | 3.4 | 100 |
| 1921 | 12.8 | 60.6 | 73.4 | 15.2 | 4.0 | 4.0 | 23.2 | 96.6 | 3.4 | 100 |
| 1922 | 7.8 | 61.8 | 69.6 | 18.1 | 4.1 | 4.6 | 26.8 | 96.4 | 3.6 | 100 |
| 1923 | 10.0 | 62.6 | 72.6 | 17.9 | 2.0 | 4.6 | 24.5 | 97.1 | 2.9 | 100 |
| 1924 | 10.5 | 59.3 | 69.8 | 19.4 | 2.1 | 5.7 | 27.2 | 97.0 | 3.0 | 100 |
| 1925 | 7.2 | 62.1 | 69.3 | 20.2 | 1.7 | 5.8 | 27.7 | 97.0 | 3.0 | 100 |
| 1926 | 8.9 | 62.3 | 71.2 | 18.5 | 1.5 | 5.8 | 25.8 | 97.0 | 3.0 | 100 |
| 1927 | 8.7 | 57.7 | 66.4 | 22.3 | 1.4 | 6.6 | 30.3 | 96.7 | 3.3 | 100 |
| 1928 | 8.2 | 56.4 | 64.6 | 22.5 | 2.0 | 7.2 | 31.7 | 96.3 | 3.7 | 100 |
| 1929 | 7.5 | 55.9 | 63.4 | 23.3 | 1.8 | 8.2 | 33.3 | 96.7 | 3.3 | 100 |
| 1930 | 7.9 | 54.6 | 62.5 | 23.2 | 1.6 | 9.3 | 34.1 | 96.6 | 3.4 | 100 |
| 1931 | 7.9 | 52.1 | 60.0 | 25.7 | 1.4 | 9.4 | 36.5 | 96.5 | 3.5 | 100 |
| 1932 | 7.6 | 49.0 | 56.6 | 27.5 | 1.5 | 10.1 | 39.1 | 95.7 | 4.3 | 100 |
| 1933 | 7.1 | 49.0 | 56.1 | 29.5 | 1.0 | 9.4 | 39.9 | 96.0 | 4.0 | 100 |
| 1934 | 7.7 | 49.7 | 57.4 | 27.8 | 1.1 | 10.0 | 38.9 | 96.3 | 3.7 | 100 |
| 1935 | 6.7 | 49.0 | 55.7 | 29.0 | .9 | 10.4 | 40.3 | 96.0 | 4.0 | 100 |
| 1936 | 6.1 | 50.9 | 57.0 | 28.2 | .9 | 10.3 | 39.4 | 96.4 | 3.6 | 100 |
| 1937 | 5.5 | 48.6 | 54.1 | 30.9 | .6 | 10.8 | 42.3 | 96.4 | 3.6 | 100 |
| 1938 | 5.6 | 43.8 | 49.4 | 33.8 | .7 | 11.9 | 46.4 | 95.8 | 4.2 | 100 |
| 1939 | 5.8 | 45.6 | 51.4 | 32.3 | .9 | 11.7 | 44.9 | 96.3 | 3.7 | 100 |
| 1940 | 5.2 | 47.9 | 53.1 | 31.1 | 1.0 | 11.3 | 43.4 | 96.5 | 3.5 | 100 |
| 1941 | 5.2 | 49.4 | 54.6 | 29.8 | 1.1 | 11.1 | 42.0 | 96.6 | 3.4 | 100 |
| 1942 | 5.2 | 52.1 | 57.3 | 27.4 | .2 | 11.2 | 38.8 | 96.1 | 3.9 | 100 |
| 1943 | 5.0 | 50.2 | 55.2 | 28.4 | .3 | 11.9 | 40.6 | 95.8 | 4.2 | 100 |
| 1944 | 4.9 | 48.9 | 53.8 | 29.3 | .8 | 12.0 | 42.1 | 95.9 | 4.1 | 100 |
| 1945 | 4.3 | 46.5 | 50.8 | 30.5 | 1.3 | 13.0 | 44.8 | 95.6 | 4.4 | 100 |
| 1946 | 4.8 | 44.0 | 48.8 | 31.6 | 1.6 | 13.6 | 46.8 | 95.6 | 4.4 | 100 |
| 1947 | 4.1 | 46.3 | 50.4 | 30.2 | 1.6 | 13.8 | 45.6 | 96.0 | 4.0 | 100 |
| 1948 [2] | 4.0 | 42.9 | 46.9 | 32.0 | 2.0 | 15.1 | 49.1 | 96.0 | 4.0 | 100 |
| 1949 [2] | 3.4 | 36.4 | 39.8 | 33.8 | 2.8 | 18.7 | 55.3 | 95.1 | 4.9 | 100 |

[1] Percentages based upon figures in table A-1.
[2] Subject to revision.

Source: Bureau of Mines.

## 2. Energy Consumption—By Type of Consumer

One method of looking at the fuel panorama of our economy is to examine the uses to which our sources of energy are put. Who are the chief consumers of energy, and of what specific types of fuels? The extent to which and the direction in which these distributive patterns of energy change over the course of time are important bench marks in charting the course which our energy economy will travel.

Of the energy-consuming sectors of the economy, household, domestic, and commercial heating in 1939 took the largest single share. Next in size came manufacturing industries. By 1947, the latter had climbed to first place as the chief energy consumer. Table B–1 shows a breakdown of consuming sectors for the 2 years, 1939 and 1947. A notable increase in share of energy consumed took place in coke ovens, nonferrous metals, in household and commercial power, in petroleum refineries, and in "other manufacturing". Sizable drops occurred in the shares consumed by railroads and for household and commercial heating. In both of these instances, more efficient utilization of energy contributed substantially to the decline.

Table B–1.—*Energy use and loss, by consumption sectors (as percent total consumption)*

| Consumption sector | 1939 | 1947 |
|---|---|---|
| Energy-producing industries: | | |
| Bituminous coal | 0.4 | 0.4 |
| Anthracite | .3 | .2 |
| Crude oil | .8 | .8 |
| Natural gas, natural gasoline, and allied | 5.7 | 5.8 |
| Coke ovens | .9 | 1.5 |
| Manufactured-gas utilities | .5 | .4 |
| Petroleum refineries | 3.5 | 4.3 |
| Electric utilities | 2.1 | 1.8 |
| Total | 14.1 | 14.7 |
| Manufacturing (1939 census groups): | | |
| Iron and steel | 7.5 | 8.1 |
| Chemicals | 3.6 | 4.2 |
| Textiles | 1.3 | 1.1 |
| Stone, clay and glass | 2.5 | 2.4 |
| Food and kindred | 2.3 | 1.9 |
| Paper and allied | 1.8 | 1.7 |
| Nonferrous metals | 1.0 | 1.3 |
| Other manufacturing, excluding refineries and coke ovens | 2.7 | 3.2 |
| Total | 22.6 | 23.9 |
| Railroads | 11.1 | 9.9 |
| Bunker | 2.3 | 2.1 |
| Household, commercial, and other domestic fuel and power: | | |
| Heat | 24.5 | 21.8 |
| Power | 4.5 | 5.3 |
| Motion | 12.5 | 11.7 |
| Total | 41.6 | 38.7 |
| Domestic chemical material, lubes, etc | 2.0 | 2.6 |
| Exports | 6.2 | 8.0 |
| Total | 100.0 | 100.0 |
| Total in $10^{15}$ B. t. u | 24.0 | 37.6 |

Notes.—(1) Totals will not add, owing to rounding. (2) Power is included in terms of B. t. u. of fuel required in its production; hydro power is measured in terms of mineral fuels equivalent in each year.
Source: Bureau of Mines Circular No. 7582.

In general, the data indicate a wide range in the energy consumption of the different sectors, a wide range in their rate of change of consumption, and a dissimilarity in the efficiency change among the consuming sectors.

Table B–2 indicates with startling clarity the different degrees of efficiency in utilization of energy for various functions. Only a little over one-half of the total energy consumed in both years—for the purpose of space and process heat—furnished over four-fifths of the total work performed.

TABLE B–2.—*Energy use and loss, by function, as percent of total consumption and work, 1939 and 1947*

| | Percent of total consumption | | Percent of total work | |
|---|---|---|---|---|
| | 1939 | 1947 | 1939 | 1947 |
| Space and process heat | 53 | 51 | 86 | 85 |
| Motion power | 25 | 23 | 7 | 7 |
| Electric power and stationary direct drive | 14 | 15 | 7 | 8 |
| Domestic chemical material, lubes, etc. | 2 | 3 | 0 | 0 |
| Exports | 6 | 8 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 |
| Total in $10^{15}$ B. t. u. | 24.0 | 37.6 | 8.9 | 15.0 |

Source: Bureau of Mines Circular No. 7582.

In "energy use and loss for motion power" the greatest gain in efficiency has occurred, a slightly smaller gain in electric power and stationary direct drive, and a rather minor gain in space and process heat efficiency.

Probably, as a result of the larger share of consumption of energy for non-work-producing functions—chemicals and exports—the ratio of energy consumed (in B. t. u.) to work performed, has declined slightly from 1939 to 1947.

This type of "anatomy" of the fuel economy is important for attempts to estimate future energy requirements of this country.

Before any estimates can be made of requirements for the several fuels, it is necessary to have a view of the over-all energy consumption habits and trends of the economy as a whole. That total can then be broken down into components through an examination of consumption patterns for each of the separate fuels.

*Bituminous coal*

Table B–3 indicates the chief consumers of bituminous coal and lignite and what trends their consumption patterns have followed.

In the case of bituminous coal and lignite, the outstanding fact is the sharp drop of about 25 percent in consumption of coal since the wartime peak of 593,797,000 tons. Chief contributor to this decline are the railroads, which accounted for almost one-quarter of coal consumption in 1943 and 1944, less than one-sixth in 1949. Their absolute consumption in 1949 dropped to only a little more than half of what it had been in 1943–44. A similar decline of one-half in the bunker-foreign trade category contributes less to the total decline

TABLE B–3.—*Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States, 1933–49, in thousands of net tons*

| Year | Electric power utilities [1] | Bunker foreign trade [2] | Railroads [3] (class I) | Coke plants | | Steel and rolling mills | Cement mills [4] | Other industrials [5] | Retail dealer deliveries [6] | Total of classes shown [7] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Beehive | Oven | | | | | |
| 1933 | 27,088 | 1,316 | 72,548 | 1,408 | 38,681 | 10,009 | 2,832 | 83,321 | 80,482 | 317,685 |
| 1934 | 29,707 | 1,321 | 76,037 | 1,635 | 44,343 | 10,898 | 3,500 | 89,448 | 86,925 | 343,814 |
| 1935 | 30,936 | 1,576 | 77,109 | 1,469 | 49,046 | 11,747 | 3,516 | 96,937 | 83,990 | 356,326 |
| 1936 | 38,104 | 1,622 | 86,391 | 2,698 | 63,244 | 13,471 | 4,771 | 113,792 | 84,200 | 408,293 |
| 1937 | 41,045 | 1,832 | 88,080 | 4,927 | 69,575 | 12,853 | 5,247 | 127,142 | 80,076 | 430,777 |
| 1938 | 36,440 | 1,352 | 73,921 | 1,360 | 45,266 | 8,412 | 4,483 | 96,527 | 66,520 | 336,281 |
| 1939 | 42,304 | 1,477 | 79,072 | 2,298 | 61,216 | 9,808 | 5,274 | 103,079 | 71,570 | 376,098 |
| 1940 | 49,126 | 1,426 | 85,130 | 4,803 | 76,583 | 10,040 | 5,633 | 110,469 | 87,700 | 430,910 |
| 1941 | 59,888 | 1,643 | 97,384 | 10,529 | 82,609 | 10,902 | 6,832 | 124,868 | 97,460 | 492,115 |
| 1942 | 63,472 | 1,585 | 115,410 | 12,876 | 87,974 | 10,434 | 7,570 | 135,979 | 104,750 | 540,050 |
| 1943 | 74,036 | 1,647 | 130,282 | 12,441 | 90,019 | 11,238 | 5,851 | 145,518 | 122,764 | 593,797 |
| 1944 | 76,656 | 1,559 | 132,049 | 10,858 | 94,438 | 10,734 | 3,789 | 134,610 | 124,906 | 589,599 |
| 1945 | 71,603 | 1,785 | 125,120 | 8,135 | 87,214 | 10,084 | 4,215 | 129,606 | 121,805 | 559,567 |
| 1946 | 68,743 | 1,381 | 110,166 | 7,167 | 76,121 | 8,603 | 7,009 | 120,610 | 100,586 | 500,386 |
| 1947 | 86,009 | 1,689 | 109,296 | 10,475 | 94,325 | 10,048 | 7,938 | 124,459 | 99,163 | 543,402 |
| 1948 | 95,620 | 1,057 | 94,838 | 10,322 | 96,984 | 10,046 | 8,554 | 112,741 | 89,747 | 519,909 |
| 1949 | 80,610 | 874 | 68,123 | 5,354 | 85,882 | 7,451 | 7,988 | 98,957 | 90,299 | 445,538 |

[1] Federal Power Commission. Represents latest available revised figures for bituminous coal and lignite consumed by public-utility power plants in power generation, including a small quantity of coke amounting to approximately 100,000 tons annually.

[2] Bureau of Census, U. S. Department of Commerce.

[3] Association of American Railroads. Represents consumption of bituminous coal and lignite by class I railways for all uses, including locomotive, powerhouse, shop, and station fuel. The Interstate Commerce Commission reports that in 1948 consumption for all uses by class I line-haul railways, plus purchases for class II and class III railways, plus purchases by all switching terminal companies combined was 99,793,401 tons of bituminous coal and lignite.

[4] Includes a small amount of anthracite.

[5] Estimates based upon receipts collected from a selected list of representative manufacturing plants and retail dealers.

[6] The total of classes shown approximates grand total consumption. It is not appropriate to "calculate" consumption from production, imports, exports and changes in stocks because certain significant items of stocks are not included in year-end stocks. These items are: Stocks on lake and tidewater docks, stocks at other intermediate storage piles between mine and consumer, and coal in transit.

Source: Bureau of Mines.

because its share is very minor. The drop in beehive coke-oven consumption resulted from the retirement, after the war, of many of these wasteful coke-making facilities in favor of byproducts ovens which have shown no major slacking in consumption—a result of the continued high rate of steel production.

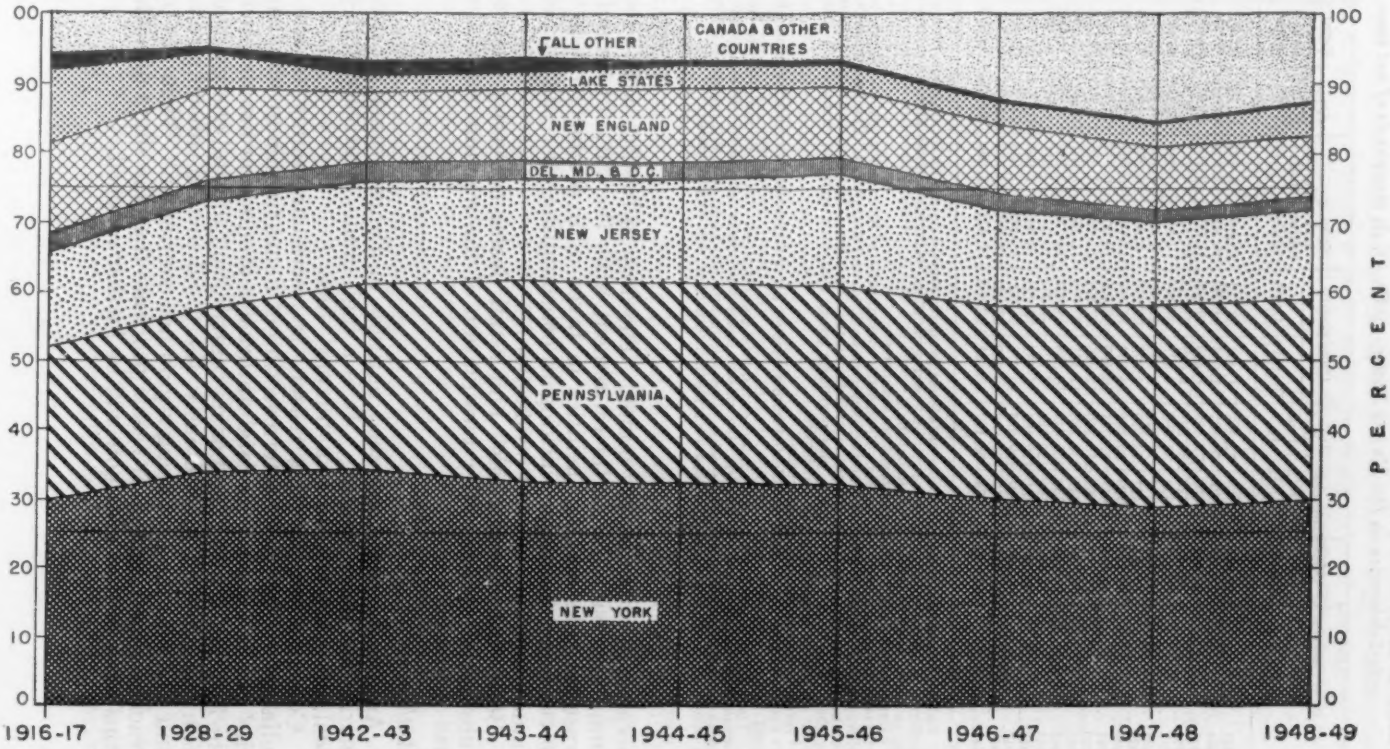
Both "other industrials" and retail dealer deliveries have shown substantial declines after termination of the wartime restrictions on use of fuel oil.

*Anthracite*

Anthracite coal, produced entirely in Pennsylvania, is used primarily for space heating. It is a high-grade, relatively high-priced coal, often referred to as a "luxury" fuel.

Consumption, for this reason, is restricted mainly to the areas adjacent to the northeastern section of Pennsylvania in which anthracite coal is mined. As total anthracite production has declined over the last half century, and as its contribution to total energy consumption has dropped precipitously, the trend toward consumption closer and closer to the producing region has continued. When natural gas reaches New England, it seems probable that the share of anthracite consumed in that area now will be further reduced.

FIGURE B–1.—PERCENTAGE DISTRIBUTION OF PENNSYLVANIA ANTHRACITE BY GEOGRAPHIC AREAS FOR THE COAL YEARS 1916–17, 1928–29, AND 1942–49.




Source: Mineral Industries Surveys, September 1949.

*Electric power*

Sales of electric power have shown a remarkable rise of about 30 percent during the years 1935 to 1948. These major consuming segments contributed evenly to this development. Small and large light and power (commercial and industrial) and residential or domestic uses each kept pace by tripling their electric energy consumption. Rural use of electric energy, spurred especially by Rural Electrification Administration projects, far outdistanced other consumers, however, with more than a fivefold climb in use of power for farm light and work.

Railways and street and other public lighting trailed far behind in relative gains.

TABLE B–4.—*Electric power—Sales to ultimate consumers*

[Millions of kilowatt-hours]

| Year (monthly average) | Total | Commercial and industrial | | Railways and railroads | Residential or domestic | Rural | Street and highway lighting | Other public authorities | Interdepartmental |
|---|---|---|---|---|---|---|---|---|---|
| | | Small light and power | Large light and power | | | | | | |
| 1935 | 6,466 | 1,132 | 3,405 | 420 | 1,165 | 101 | | | |
| 1936 | 7,504 | 1,301 | 4,055 | 460 | 1,305 | 123 | | | |
| 1937 | 8,280 | 1,506 | 4,280 | 476 | 1,474 | 139 | 155 | 200 | 49 |
| 1938 | 7,811 | 1,595 | 3,595 | 453 | 1,614 | 131 | 161 | 204 | 57 |
| 1939 | 8,814 | 1,727 | 4,259 | 480 | 1,757 | 157 | 167 | 211 | 56 |
| 1940 | 9,887 | 1,864 | 4,963 | 492 | 1,943 | 166 | 171 | 227 | 61 |
| 1941 | 11,672 | 2,052 | 6,338 | 507 | 2,094 | 196 | 176 | 258 | 51 |
| 1942 | 13,284 | 2,269 | 7,365 | 552 | 2,245 | 241 | 172 | 351 | 90 |
| 1943 | 15,491 | 2,349 | 8,888 | 602 | 2,385 | 250 | 173 | 762 | 82 |
| 1944 | 16,513 | 2,486 | 9,590 | 611 | 2,606 | 281 | 180 | 705 | 45 |
| 1945 | 16,130 | 2,537 | 8,957 | 613 | 2,849 | 306 | 182 | 632 | 54 |
| 1946 | 15,900 | 2,751 | 8,240 | 596 | 3,214 | 369 | 189 | 488 | 52 |
| 1947 | 18,132 | 3,198 | 9,460 | 592 | 3,681 | 463 | 197 | 493 | 48 |
| 1948 | 20,062 | 3,599 | 10,341 | 560 | 4,248 | 527 | 210 | 521 | 55 |

NOTE.—Compiled by the Edison Electric Institute. Data are industry estimates computed from enterprises representing approximately 85 percent of the industry. These data cover statistics for the entire electric light and power industry contributing to the public supply in the United States, which includes all private, cooperative, municipal, governmental, and industrial enterprises engaged in the production or distribution of electricity for the use of the public.

Source: 1949 Statistical Supplement—Survey of Current Business (from Edison Electric Institute).

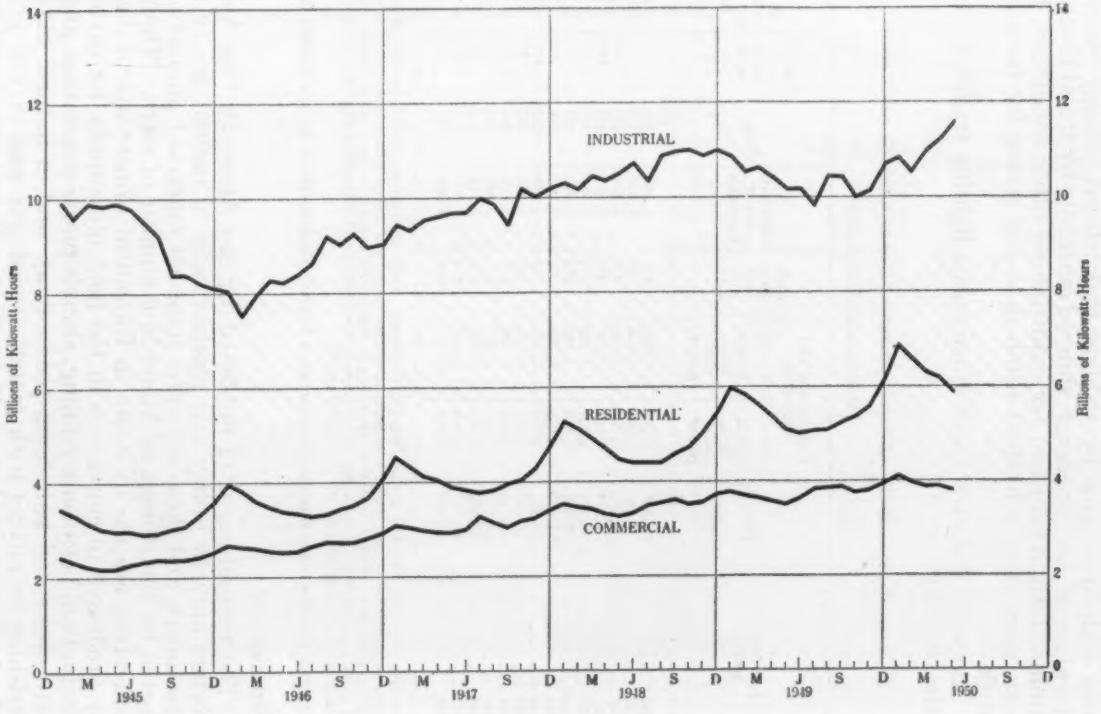
*Natural gas*

The natural-gas data published by the American Gas Association pertain only to utility and pipeline sales of natural gas to ultimate consumers, and therefore differ from net marketed production, as reported by the Bureau of Mines in a number of ways. The principal differences are the inclusion in Bureau of Mines data of direct sales by producers to consumers in the field (principally for carbon black production, petroleum refining, electric-power generation, and further natural-gas and petroleum production), and of natural gas used for enriching or mixing with manufactured gas and in the production of reformed natural gas. Table B–5 will indicate the difference in totals for the years 1944–48:

Source: Mineral Industries Surveys, September 1949.

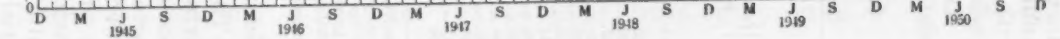
FIGURE B–2.

RESIDENTIAL, COMMERCIAL AND INDUSTRIAL SALES OF ELECTRIC ENERGY
UNITED STATES




Source: Federal Power Commission.

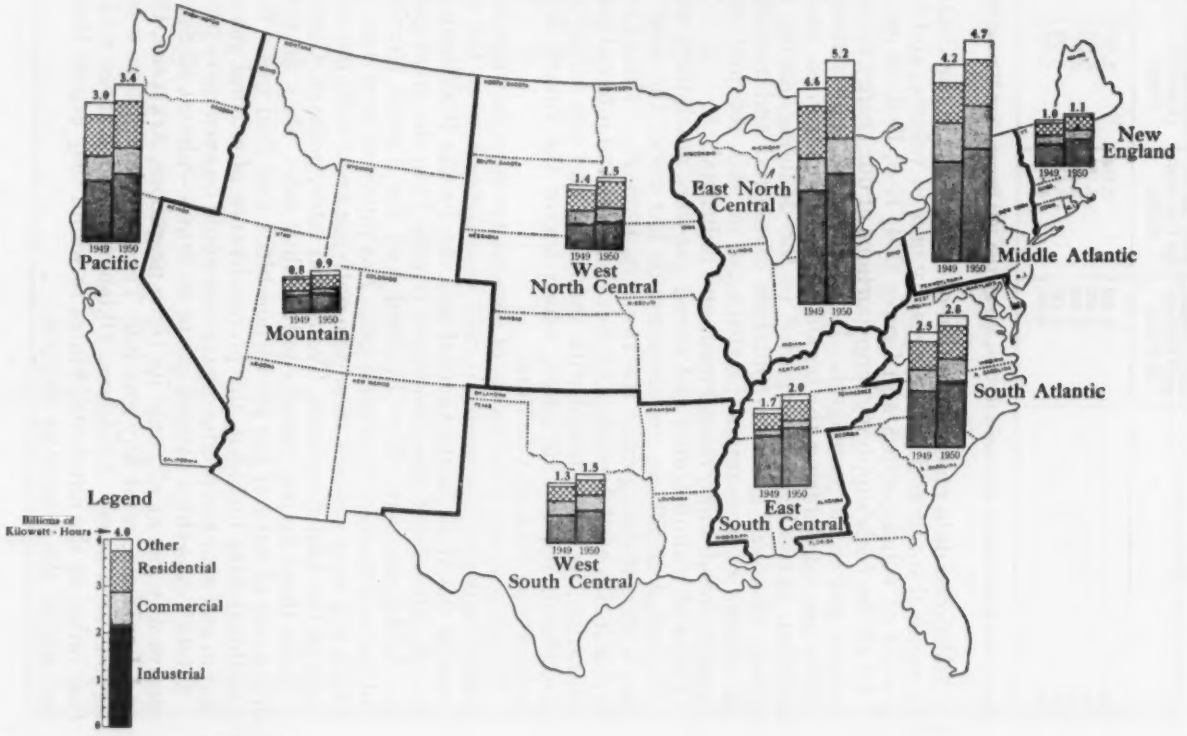
FIGURE B–3.




Source: Federal Power Commission.

FIGURE B–3.

## Sales of Electric Energy to Ultimate Consumers
## Geographic Divisions
### May 1949 - 1950




Source: Federal Power Commission.

TABLE B–5.—*Natural gas utility sales and industrial consumption*

[In billions of cubic feet]

| Year | Natural gas consumed in United States, total (Bureau of Mines) | Natural gas utility sales, total (American Gas Association) | Industrial consumption of natural gas (Bureau of Mines) | Utility sales of natural gas to industry (American Gas Association) |
|---|---|---|---|---|
| 1944 | 3,696 | 2,114 | 2,913 | 1,383 |
| 1945 | 3,900 | 2,156 | 3,063 | 1,344 |
| 1946 | 4,013 | 2,195 | 3,110 | 1,468 |
| 1947 | 4,426 | 2,515 | 3,339 | 1,668 |
| 1948 | 4,945 | 3,108 | 3,726 | 1,776 |

Sources: Gas Facts, 1949, p. 105; Bureau of Mines, Natural Gas, 1949, preprint from Minerals Yearbook, p. 18.

Additional data on consumption of natural gas in the United States by regional totals and percentages, by uses in volume, and by uses in percent of volume appears in figures B–4, B–5, B–6, on pp. 17–18.

Of all the fuels supplying large portions of our energy requirements, natural gas is the youngest. It is, therefore, not surprising that utility gas sales during the period 1932–49 quadrupled, and that, in addition, natural gas contributed to the doubling, during the same period, of mixed gas sales (mixture of natural and manufactured). All classes of consumers participated in this fourfold rise about equally—residential, commercial, and industrial.

Gains of manufactured and mixed gas were much more modest.

Liquefied petroleum gas consumption has shown the most dramatic rise, with a 40-fold gain in the 15 years, 1935–49. Almost two-thirds of this fuel is used domestically, but chemical and internal combustion utilization, in combination with industrial and gas utility use, have also shown remarkable gains, which leaves the future distribution pattern uncertain at this time.

The geographic distribution of natural gas sales shown in table B–12 clearly indicates the preponderant consumption near the producing areas in the West South Central and the Pacific (California) regions. On the other hand, the areas most remote from the great gas fields of the Mid-Continent—New England and the Pacific Northwest—do not yet enjoy access to natural gas. But pipelines have been projected which will soon connect these two outlying areas with the natural gas wells of the Mid-Continent, Texas, and later, perhaps, Canada.

Since these figures include only utility sales, they do not include direct use of natural gas for carbon black and field use. Were these additional data included, the preponderance of natural gas consumption in and near the producing regions would be even more pronounced.

While Texas ships natural gas to 30 States—almost all States which receive any gas at all, only its three neighbors, Arkansas, Oklahoma, and Louisiana, send any gas into Texas—primarily on a local, contiguous area basis. Louisiana, Oklahoma, and Kansas rank next, in that order, in the number of States to whom they export their natural gas, and in the quantities shipped.

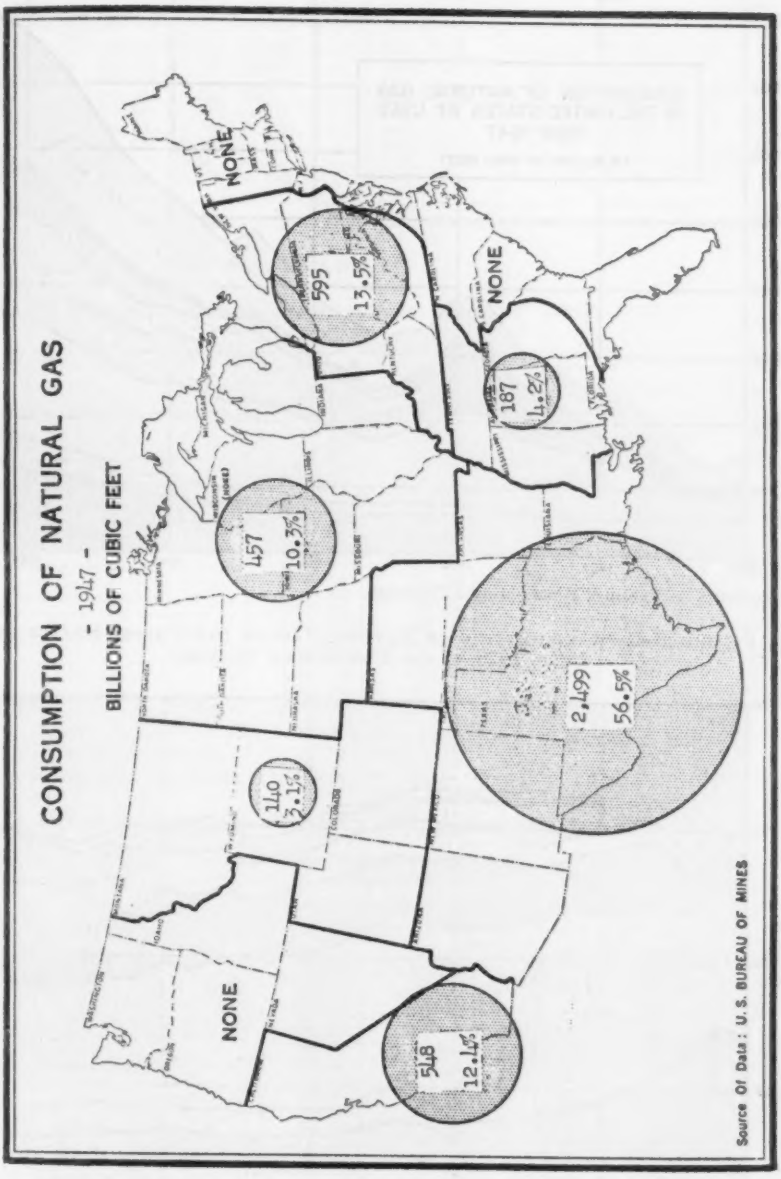
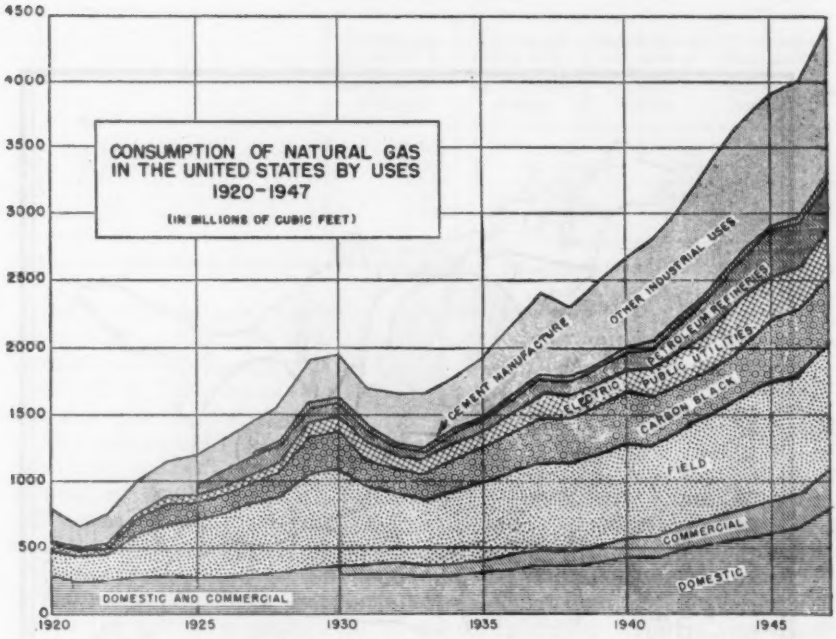

CONSUMPTION OF NATURAL GAS
- 1947 -
BILLIONS OF CUBIC FEET
NONE
595
13.5%
NONE
187
4.2%
457
10.3%
140
3.1%
2,499
56.5%
NONE
548
12.4%
Source Of Data: U.S. BUREAU OF MINES

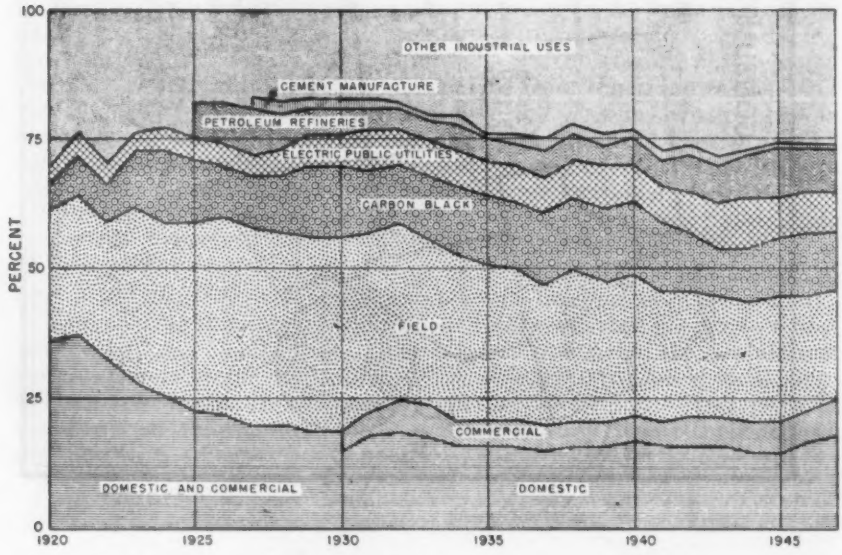
FIGURE B–4.

FIGURE B–5.




Source: U. S. Bureau of Mines—Mineral Yearbooks.

FIGURE B–6.—CONSUMPTION OF NATURAL GAS IN THE UNITED STATES BY USES, 1920–47 (IN PERCENT OF VOLUME).




Source: U. S. Bureau of Mines—Minerals yearbook.

TABLE B–6.—*Utility gas sales, by type of gas, 1932–49*

[Millions of cubic feet]

| Year | Natural | Manufactured | Mixed | Liquefied petroleum | Year | Natural | Manufactured | Mixed | Liquefied petroleum |
|---|---|---|---|---|---|---|---|---|---|
| 1932 | 775, 499 | 324, 414 | 60, 093 | | 1941 | 1, 569, 880 | 333, 218 | 108, 716 | |
| 1933 | 791, 651 | 299, 210 | 66, 917 | | 1942 | 1, 728, 802 | 357, 930 | 121, 461 | |
| 1934 | 932, 550 | 302, 986 | 72, 191 | | 1943 | 1, 959, 001 | 373, 006 | 132, 313 | |
| 1935 | 1, 010, 088 | 303, 710 | 79, 071 | | 1944 | 2, 113, 716 | 384, 559 | 134, 969 | |
| 1936 | 1, 200, 376 | 287, 022 | 86, 513 | | 1945 | 2, 155, 894 | 388, 606 | 141, 996 | 2, 716 |
| 1937 | 1, 284, 120 | 292, 593 | 88, 346 | | 1946 | 2, 194, 948 | 405, 342 | 148, 547 | 4, 110 |
| 1938 | 1, 184, 629 | 292, 085 | 85, 614 | | 1947 | 2, 515, 251 | 434, 101 | 172, 069 | 7, 181 |
| 1939 | 1, 297, 979 | 303, 144 | 89, 751 | | 1948 | 2, 894, 650 | 442, 154 | 148, 102 | 10, 000 |
| 1940 | 1, 406, 061 | 324, 103 | 101, 166 | | 1949 | 3, 107, 865 | 423, 640 | 139, 459 | 10, 408 |

NOTE.—Liquefied petroleum gas data are included with manufactured gas prior to 1945. Excludes sales for resale.

Source: American Gas Association, Gas Facts, 1949.

TABLE B–7.—*Natural gas utility sales, by class of service, 1932–49*

[Millions of cubic feet]

| Year | Total | Residential | Commercial | Industrial | Other |
|---|---|---|---|---|---|
| 1932 | 775, 499 | 276, 012 | 82, 849 | 414, 018 | 2, 620 |
| 1933 | 791, 651 | 243, 350 | 80, 769 | 465, 957 | 1, 575 |
| 1934 | 932, 550 | 237, 567 | 75, 154 | 615, 104 | 4, 725 |
| 1935 | 1, 010, 088 | 260, 250 | 85, 322 | 661, 216 | 3, 300 |
| 1936 | 1, 200, 376 | 301, 720 | 99, 491 | 779, 493 | 19, 672 |
| 1937 | 1, 284, 120 | 315, 239 | 99, 432 | 840, 780 | 28, 669 |
| 1938 | 1, 184, 629 | 315, 130 | 99, 137 | 736, 094 | 34, 268 |
| 1939 | 1, 297, 979 | 342, 840 | 106, 528 | 821, 899 | 26, 712 |
| 1940 | 1, 406, 061 | 382, 444 | 116, 838 | 888, 425 | 18, 354 |
| 1941 | 1, 569, 880 | 386, 782 | 120, 940 | 1, 041, 659 | 20, 499 |
| 1942 | 1, 728, 802 | 454, 003 | 151, 584 | 1, 087, 895 | 35, 320 |
| 1943 | 1, 959, 001 | 478, 097 | 161, 054 | 1, 275, 042 | 44, 808 |
| 1944 | 2, 113, 716 | 504, 711 | 171, 977 | 1, 383, 108 | 53, 920 |
| 1945 | 2, 155, 894 | 551, 982 | 174, 428 | 1, 343, 890 | 85, 594 |
| 1946 | 2, 194, 948 | 606, 128 | 183, 368 | 1, 354, 560 | 50, 892 |
| 1947 | 2, 515, 251 | 740, 572 | 224, 295 | 1, 467, 504 | 82, 880 |
| 1948 | 2, 894, 650 | 832, 205 | 280, 431 | 1, 668, 437 | 113, 577 |
| 1949 | 3, 107, 865 | 913, 300 | 300, 441 | 1, 775, 821 | 118, 303 |

NOTE.—Excludes sales for resale.

Source: American Gas Association.

TABLE B–8.—*Manufactured gas sales, by class of service, 1932–49*

[Millions of cubic feet]

| Year | Total | Residential | Commercial | Industrial | Other |
|---|---|---|---|---|---|
| 1932 | 324, 414 | 253, 108 | 42, 920 | 25, 888 | 2, 498 |
| 1933 | 299, 210 | 240, 242 | 38, 209 | 28, 694 | 2, 065 |
| 1934 | 302, 986 | 229, 027 | 39, 540 | 32, 420 | 1, 999 |
| 1935 | 303, 710 | 224, 259 | 40, 029 | 37, 326 | 2, 096 |
| 1936 | 287, 022 | 210, 789 | 41, 733 | 32, 233 | 2, 267 |
| 1937 | 292, 593 | 210, 959 | 42, 631 | 36, 925 | 2, 078 |
| 1938 | 292, 085 | 209, 337 | 44, 339 | 36, 335 | 2, 074 |
| 1939 | 303, 144 | 213, 626 | 46, 169 | 41, 137 | 2, 212 |
| 1940 | 324, 103 | 224, 765 | 48, 680 | 48, 259 | 2, 399 |
| 1941 | 333, 218 | 221, 624 | 49, 916 | 58, 980 | 2, 698 |
| 1942 | 357, 930 | 231, 974 | 52, 580 | 70, 405 | 2, 971 |
| 1943 | 373, 006 | 238, 612 | 50, 803 | 80, 681 | 2, 910 |
| 1944 | 384, 559 | 246, 118 | 52, 800 | 82, 449 | 3, 192 |
| 1945 | 388, 606 | 254, 299 | 56, 744 | 72, 455 | 5, 108 |
| 1946 | 405, 342 | 272, 797 | 62, 571 | 65, 259 | 4, 715 |
| 1947 | 434, 101 | 291, 274 | 68, 566 | 69, 723 | 4, 538 |
| 1948 | 442, 154 | 295, 797 | 71, 558 | 70, 449 | 4, 350 |
| 1949 | 423, 640 | 284, 335 | 71, 047 | 63, 690 | 4, 568 |

NOTE.—Liquefied petroleum gas sales are included prior to 1945.

Source: American Gas Association

TABLE B–9.—*Mixed gas sales, by class of service, 1932–49*

[Millions of cubic feet]

| Year | Total | Residential | Commercial | Industrial | Other |
|---|---|---|---|---|---|
| 1932 | 60,093 | 43,634 | 9,816 | 6,526 | 117 |
| 1933 | 66,917 | 47,718 | 10,459 | 8,539 | 201 |
| 1934 | 72,191 | 51,627 | 10,770 | 9,615 | 179 |
| 1935 | 79,071 | 56,040 | 10,896 | 11,949 | 186 |
| 1936 | 86,513 | 59,333 | 11,722 | 15,271 | 187 |
| 1937 | 88,346 | 60,078 | 12,177 | 15,929 | 162 |
| 1938 | 85,614 | 58,937 | 11,682 | 14,829 | 166 |
| 1939 | 89,751 | 61,576 | 12,086 | 15,934 | 155 |
| 1940 | 101,166 | 69,021 | 13,161 | 18,769 | 215 |
| 1941 | 108,716 | 71,171 | 13,628 | 23,411 | 506 |
| 1942 | 121,461 | 79,735 | 15,083 | 25,623 | 1,020 |
| 1943 | 132,313 | 85,307 | 15,352 | 30,068 | 1,586 |
| 1944 | 134,969 | 84,807 | 15,499 | 33,024 | 1,639 |
| 1945 | 141,996 | 92,167 | 19,895 | 28,500 | 1,434 |
| 1946 | 148,547 | 99,179 | 21,061 | 26,978 | 1,329 |
| 1947 | 172,069 | 113,969 | 24,778 | 31,891 | 1,431 |
| 1948 | 148,102 | 92,216 | 22,292 | 32,384 | 1,210 |
| 1949 | 139,459 | 82,450 | 21,020 | 34,921 | 1,068 |

Source: American Gas Association Gas Facts 1949.

TABLE B–10.—*Liquefied petroleum gas sales, by class of service, 1945–49*

[Millions of cubic feet]

| Year | Total | Residential | Commercial | Industrial | Other |
|---|---|---|---|---|---|
| 1945 | 2,716 | 1,712 | 946 | 51 | 7 |
| 1946 | 4,110 | 2,533 | 1,319 | 162 | 96 |
| 1947 | 7,181 | 4,499 | 2,196 | 377 | 109 |
| 1948 | 10,000 | 6,341 | 3,048 | 572 | 39 |
| 1949 | 10,408 | 6,765 | 3,105 | 502 | 36 |

NOTE.—Included with manufactured gas prior to 1945.

Source: American Gas Association Gas Facts, 1949.

TABLE B–11.—*Total liquefied petroleum gas sales in liquid form to ultimate consumers, by major use, 1935–49*

[Thousands of gallons]

| Year | Total | Gas utility | Domestic | Industrial | Internal combustion engine fuel | Chemical manufacturing | Synthetic rubber | Other |
|---|---|---|---|---|---|---|---|---|
| 1935 | 76,855 | 7,581 | 21,380 | [1] | [1] | [1] | 0 | 47,894 |
| 1936 | 106,652 | 9,371 | 30,014 | [1] | 12,476 | [1] | 0 | 54,791 |
| 1937 | 141,400 | 11,175 | 40,823 | 43,310 | 16,987 | 26,792 | 0 | 2,313 |
| 1938 | 165,201 | 12,386 | 57,832 | 38,849 | 20,914 | 32,299 | 0 | 2,921 |
| 1939 | 223,580 | 15,435 | 87,530 | 62,340 | 29,792 | 26,892 | 0 | 1,591 |
| 1940 | 313,456 | 20,285 | 134,018 | 69,892 | 53,918 | 34,671 | 0 | 672 |
| 1941 | 462,852 | 25,255 | 220,722 | 98,728 | 66,871 | 44,206 | 0 | 7,070 |
| 1942 | 585,440 | 31,366 | 299,559 | 114,132 | 82,456 | 53,038 | 0 | 4,889 |
| 1943 | 675,233 | 37,519 | 339,380 | 149,429 | 87,834 | 55,356 | 0 | 5,715 |
| 1944 | 1,060,156 | 45,879 | 445,617 | 162,018 | 92,495 | 151,985 | 162,085 | 77 |
| 1945 | 1,276,766 | 53,849 | 533,262 | 163,121 | 93,340 | 224,291 | 208,787 | 116 |
| 1946 | 1,704,262 | 86,660 | 758,466 | 159,115 | 94,592 | 311,499 | 293,892 | 38 |
| 1947 | 2,209,797 | 169,332 | 1,150,538 | 173,601 | 99,786 | 414,267 | 201,535 | 738 |
| 1948 [2] | 2,736,801 | 237,638 | 1,473,289 | 213,904 | 92,941 | 490,964 | 225,641 | 2,424 |
| 1949 [2] | [3] 2,725,000 | 240,000 | 1,650,000 | 310,000 | | 525,000 | [4] | [4] |

[1] Included in "Other."
[2] Preliminary.
[3] Excludes synthetic rubber.
[4] Not available.
[5] Included in industrial.

Source: U. S. Bureau of Mines.

TABLE B–12.—*Natural gas sales of utilities, by State and class of service, 1949*

[Millions of cubic feet]

| Division and State | Total | Class of service | | | |
|---|---|---|---|---|---|
| | | Residential | Commercial | Industrial | Other |
| United States | 3,107,865 | 913,300 | 300,441 | 1,775,821 | 118,303 |
| New England | 0 | 0 | 0 | 0 | 0 |
| Middle Atlantic | 208,770 | 89,724 | 18,383 | 99,487 | 1,176 |
| New Jersey | 2,156 | 40 | 9 | 2,107 | 0 |
| New York | 31,093 | 20,585 | 4,092 | 6,052 | 364 |
| Pennsylvania | 175,521 | 69,099 | 14,282 | 91,328 | 812 |
| East North Central | 481,836 | 219,047 | 44,645 | 216,169 | 1,975 |
| Illinois | 115,425 | 23,438 | 5,682 | 86,042 | 263 |
| Indiana | 40,842 | 10,836 | 2,823 | 26,856 | 327 |
| Michigan | 79,356 | 49,818 | 8,108 | 21,267 | 163 |
| Ohio | 244,827 | 134,043 | 27,784 | 81,788 | 1,212 |
| Wisconsin | 1,386 | 912 | 248 | 216 | 10 |
| West North Central | 401,765 | 125,787 | 39,672 | 217,911 | 18,395 |
| Iowa | 35,772 | 12,860 | 4,616 | 18,222 | 74 |
| Kansas | 167,862 | 43,113 | 13,517 | 99,507 | 11,725 |
| Minnesota | 50,434 | 19,992 | 4,504 | 25,146 | 792 |
| Missouri | 85,346 | 30,488 | 6,904 | 46,320 | 1,634 |
| Nebraska | 50,863 | 14,972 | 7,247 | 24,745 | 3,899 |
| North Dakota | 2,870 | 1,606 | 889 | 226 | 149 |
| South Dakota | 8,618 | 2,756 | 1,995 | 3,745 | 122 |
| South Atlantic | 163,397 | 57,177 | 15,797 | 87,182 | 3,241 |
| Delaware | 0 | 0 | 0 | 0 | 0 |
| District of Columbia | 9,041 | 6,640 | 1,842 | 200 | 359 |
| Florida | 9,969 | 718 | 199 | 7,421 | 1,631 |
| Georgia | 54,844 | 12,392 | 5,027 | 37,061 | 364 |
| Maryland | 4,756 | 3,855 | 389 | 487 | 25 |
| North Carolina | 0 | 0 | 0 | 0 | 0 |
| South Carolina | 0 | 0 | 0 | 0 | 0 |
| Virginia | 4,037 | 2,717 | 754 | 455 | 111 |
| West Virginia | 80,750 | 30,855 | 7,586 | 41,558 | 751 |
| East South Central | 178,864 | 39,742 | 15,624 | 118,109 | 5,389 |
| Alabama | 69,064 | 8,510 | 3,034 | 57,519 | 1 |
| Kentucky | 24,294 | 13,123 | 3,240 | 7,813 | 118 |
| Mississippi | 49,099 | 8,708 | 5,111 | 31,121 | 4,159 |
| Tennessee | 36,407 | 9,401 | 4,239 | 21,656 | 1,111 |
| West South Central | 1,023,276 | 148,205 | 63,676 | 771,021 | 40,374 |
| Arkansas | 86,247 | 14,214 | 6,906 | 63,882 | 1,185 |
| Louisiana | 224,667 | 20,071 | 5,997 | 192,611 | 5,988 |
| Oklahoma | 148,329 | 37,566 | 15,993 | 88,186 | 6,584 |
| Texas | 564,033 | 76,354 | 34,720 | 426,342 | 26,617 |
| Mountain | 211,829 | 58,113 | 26,532 | 118,738 | 8,446 |
| Arizona | 38,483 | 5,013 | 3,139 | 29,925 | 406 |
| Colorado | 67,922 | 19,925 | 9,396 | 33,697 | 4,904 |
| Idaho | 0 | 0 | 0 | 0 | 0 |
| Montana | 29,941 | 11,164 | 5,318 | 12,163 | 1,296 |
| Nevada | 0 | 0 | 0 | 0 | 0 |
| New Mexico | 28,740 | 6,379 | 4,206 | 17,518 | 637 |
| Utah | 24,852 | 8,930 | 1,183 | 14,738 | 1 |
| Wyoming | 21,891 | 6,702 | 3,290 | 10,697 | 1,202 |
| Pacific | 438,128 | 175,505 | 76,112 | 147,204 | 39,307 |
| California | 438,128 | 175,505 | 76,112 | 174,204 | 39,307 |
| Oregon | 0 | 0 | 0 | 0 | 0 |
| Washington | 0 | 0 | 0 | 0 | 0 |

Source: American Gas Association Gas Facts, 1949

TABLE B–13.—*Interstate transmission of natural gas, by State of origin, with State of destination, 1948*

[Millions of cubic feet]

| State of origin | State of destination | Gas transported |
|---|---|---|
| United States | | 1,737,925 |
| Arkansas | Texas | 2,286 |
| Colorado | Total | 6,110 |
| | Utah | 6,051 |
| | Wyoming | 59 |
| Indiana | Illinois | 22 |
| Kansas | Total | 185,523 |
| | Nebraska | 32,854 |
| | Minnesota | 32,012 |
| | Michigan | 30,854 |
| | Iowa | 23,221 |
| | Colorado | 19,995 |
| | Indiana | 11,641 |
| | Ohio | 10,800 |
| | Missouri | 10,347 |
| | Illinois | 9,008 |
| | South Dakota | 3,468 |
| | Oklahoma | 1,323 |
| Kentucky | Total | 42,521 |
| | Pennsylvania | 16,480 |
| | West Virginia | 10,670 |
| | District of Columbia | 6,500 |
| | Ohio | 5,082 |
| | Maryland | 1,709 |
| | Virginia | 1,149 |
| | Indiana | 837 |
| | New York | 60 |
| | Illinois | 34 |
| Louisiana | Total | 294,484 |
| | Arkansas | 49,640 |
| | Missouri | 33,338 |
| | Alabama | 31,376 |
| | Mississippi | 31,243 |
| | Tennessee | 29,442 |
| | Illinois | 26,781 |
| | Ohio | 22,747 |
| | Georgia | 21,975 |
| | Texas | 16,317 |
| | Pennsylvania | 14,379 |
| | New York | 6,348 |
| | Florida | 5,292 |
| | Indiana | 3,147 |
| | Kentucky | 2,055 |
| | West Virginia | 345 |
| | Maryland | 40 |
| | Virginia | 19 |
| Mississippi | Total | 36,704 |
| | Alabama | 15,504 |
| | Georgia | 11,538 |
| | Louisiana | 7,239 |
| | Florida | 2,423 |
| Montana | Total | 5,589 |
| | North Dakota | 3,099 |
| | South Dakota | 2,490 |
| New Mexico | Total | 90,433 |
| | California | 51,516 |
| | Arizona | 29,260 |
| | Texas | 9,058 |
| | Colorado | 599 |
| New York | Pennsylvania | 440 |
| North Dakota | South Dakota | 643 |
| Ohio | West Virginia | 535 |
| Oklahoma | Total | 206,175 |
| | Kansas | 101,227 |
| | Missouri | 34,809 |
| | Michigan | 21,280 |
| | Texas | 13,336 |
| | Indiana | 10,384 |
| | Illinois | 9,245 |
| | Ohio | 7,501 |
| | Arkansas | 4,600 |
| | Nebraska | 1,666 |
| | Iowa | 1,079 |
| | Minnesota | 962 |
| | South Dakota | 75 |
| | Wisconsin | 11 |
| Pennsylvania | Total | 18,033 |
| | New York | 16,246 |
| | West Virginia | 1,156 |
| | Maryland | 631 |
| Texas | Total | 701,293 |
| | Illinois | 115,668 |
| | Ohio | 97,346 |
| | Kansas | 53,773 |
| | Pennsylvania | 51,823 |
| | Colorado | 40,024 |
| | West Virginia | 39,769 |
| | Iowa | 29,068 |
| | Louisiana | 28,021 |
| | Indiana | 26,864 |
| | Kentucky | 23,296 |
| | Minnesota | 20,469 |
| | Michigan | 19,880 |
| | Oklahoma | 16,429 |
| | New York | 15,232 |
| | Alabama | 14,805 |
| | Missouri | 14,590 |
| | Georgia | 14,268 |
| | Nebraska | 14,051 |
| | California | 14,044 |
| | Mississippi | 10,807 |
| | Tennessee | 9,340 |
| | Arkansas | 8,439 |
| | New Mexico | 8,165 |
| | Arizona | 7,967 |
| | South Dakota | 2,216 |
| | Wyoming | 1,617 |
| | Florida | 1,231 |
| | Virginia | 1,109 |
| | Maryland | 614 |
| | Wisconsin | 418 |
| Virginia | Tennessee | 26 |
| West Virginia | Total | 131,398 |
| | Pennsylvania | 59,306 |
| | Ohio | 57,616 |
| | New York | 7,881 |
| | District of Columbia | 3,308 |
| | Virginia | 1,768 |
| | Maryland | 1,519 |
| Wyoming | Total | 15,710 |
| | Utah | 9,336 |
| | Montana | 3,881 |
| | Nebraska | 2,493 |

Source: U. S. Bureau of Mines.

FIGURE B-7.—NET INTERSTATE TRANSMISSION OF NATURAL GAS, 1948.

FIGURE B–7.—NET INTERSTATE TRANSMISSION OF NATURAL GAS, 1948.

Source: American Gas Association Gas Facts, 1949.

TABLE B–14.—*Total gas customers of utilities, yearly averages, 1932–49*

[Thousands]

| Year | Total | Type of gas | | | |
|---|---|---|---|---|---|
| | | Natural | Manufactured | Mixed | Liquefied petroleum |
| 1932 | 15,536 | 5,317 | 8,662 | 1,557 | ---------- |
| 1933 | 15,199 | 4,978 | 8,440 | 1,781 | ---------- |
| 1934 | 15,511 | 5,256 | 8,425 | 1,830 | ---------- |
| 1935 | 15,874 | 5,493 | 8,470 | 1,911 | ---------- |
| 1936 | 16,185 | 6,156 | 8,035 | 1,994 | ---------- |
| 1937 | 16,620 | 6,361 | 8,239 | 2,020 | ---------- |
| 1938 | 16,907 | 6,585 | 8,285 | 2,037 | ---------- |
| 1939 | 17,147 | 6,760 | 8,323 | 2,064 | ---------- |
| 1940 | 17,622 | 7,066 | 8,434 | 2,122 | ---------- |
| 1941 | 18,149 | 7,365 | 8,563 | 2,221 | ---------- |
| 1942 | 18,759 | 7,791 | 8,677 | 2,291 | ---------- |
| 1943 | 19,088 | 8,231 | 8,539 | 2,318 | ---------- |
| 1944 | 19,585 | 8,525 | 8,653 | 2,407 | ---------- |
| 1945 | 19,977 | 8,914 | 8,582 | 2,400 | 81 |
| 1946 | 20,637 | 9,366 | 8,730 | 2,418 | 123 |
| 1947 | 21,417 | 10,189 | 8,642 | 2,354 | 232 |
| 1948 | 22,246 | 11,466 | 8,503 | 1,962 | 315 |
| 1949 | 23,036 | 12,473 | 8,454 | 1,757 | 352 |

NOTE:—Prior to 1945, liquefied petroleum gas customers are included with manufactured gas. Excludes customers purchasing for resale.

Source: American Gas Association.

The sharpest increase in industrial consumption of natural gas over the last 17 years (1932–48) took place in petroleum refineries, where it is used largely as convenient, local fuel. Other industrial and public utility power plants ranked next in increased consumption. Field use only doubled, however, while over-all consumption multiplied threefold.

TABLE B–15.—*Industrial consumption of natural gas in the United States, by type of industry, 1932–48*

[Millions of cubic feet]

| Year | Total | Field use | Carbon black plants | Petroleum refineries | Portland cement plants | Electric public utility power plants [1] | Other industrial [1] |
|---|---|---|---|---|---|---|---|
| 1932 | 1,168,448 | 529,378 | 168,237 | 67,467 | 21,440 | 107,239 | 274,687 |
| 1933 | 1,184,625 | 491,159 | 190,081 | 66,333 | 22,001 | 102,601 | 312,450 |
| 1934 | 1,385,491 | 554,542 | 229,933 | 79,965 | 27,331 | 127,896 | 365,824 |
| 1935 | 1,496,216 | 580,414 | 241,589 | 80,175 | 26,752 | 125,239 | 442,047 |
| 1936 | 1,705,549 | 618,468 | 283,421 | 93,183 | 36,923 | 156,080 | 517,474 |
| 1937 | 1,913,807 | 651,320 | 341,085 | 113,005 | 40,450 | 170,567 | 597,380 |
| 1938 | 1,812,029 | 659,203 | 324,950 | 109,741 | 37,336 | 169,988 | 510,811 |
| 1939 | 1,964,278 | 680,884 | 347,270 | 97,685 | 40,233 | 191,131 | 607,075 |
| 1940 | 2,076,369 | 711,861 | 368,802 | 128,007 | 41,949 | 183,156 | 642,594 |
| 1941 | 2,218,281 | 686,158 | 365,377 | 148,127 | 54,208 | 205,156 | 759,255 |
| 1942 | 2,362,633 | 721,063 | 335,533 | 201,670 | 64,540 | 238,736 | 801,091 |
| 1943 | 2,669,242 | 780,986 | 315,562 | 243,584 | 51,748 | 305,576 | 971,786 |
| 1944 | 2,913,533 | 855,180 | 355,770 | 315,311 | 35,588 | 359,745 | 991,939 |
| 1945 | 3,062,980 | 916,952 | 431,830 | 338,458 | 38,349 | 326,190 | 1,011,201 |
| 1946 | 3,110,308 | 897,809 | 478,349 | 331,520 | 58,004 | 306,924 | 1,037,702 |
| 1947 | 3,339,181 | 933,761 | 484,882 | 363,892 | 60,499 | 373,037 | 1,123,110 |
| 1948 | 3,725,747 | 1,021,513 | 480,646 | 441,470 | 72,139 | 478,097 | 1,231,882 |

[1] Consumption by electric public utility power plants includes small quantities of gas other than natural, impossible to segregate. To this extent consumption by other industrials is understated.

NOTE.—Industrial consumption as reported by the Bureau of Mines includes sales by nonutility producers and others, and natural gas mixed with manufactured gas.

Source: U. S. Bureau of Mines. (Consumption of "electric public utility power plants" as reported to the Bureau by the Federal Power Commission.)

*Petroleum*

## GASOLINE PRODUCTION AND CONSUMPTION BY STATES

Table B–16 showing the production and consumption of gasoline by States indicates roughly the areas of surplus production and deficit supply. The refinery production used is compiled from reports to the Bureau of Mines, and the consumption figures are compiled from State tax reports by the American Petroleum Institute. The production figure employed does not include the natural gasoline

TABLE B–16.—*Production and consumption of gasoline in the United States, 1946–48, by States*

[Thousands of barrels]

| State | 1946 | | 1947 | | 1948 [1] | |
|---|---|---|---|---|---|---|
| | Production [11] | Consumption [2] | Production [11] | Consumption [2] | Production [11] | Consumption [2] |
| Alabama | (3) | 9,374 | (3) | 10,409 | (3) | 11,342 |
| Arizona | | 4,084 | | 4,531 | | 4,936 |
| Arkansas | 4,112 | 6,543 | 4,768 | 7,169 | 6,026 | 7,806 |
| California | [4] 110,372 | 75,461 | [4] 122,888 | 81,144 | [4] 126,214 | 86,744 |
| Colorado | 2,716 | 8,051 | 2,657 | 8,855 | 2,618 | 9,416 |
| Connecticut | | 9,156 | | 10,037 | | 10,528 |
| Delaware | | 1,666 | | 1,859 | | 1,988 |
| District of Columbia | | 3,470 | | 3,754 | | 3,992 |
| Florida | | 13,611 | | 15,339 | | 17,350 |
| Georgia | [5] 6,635 | 12,919 | [5] 7,461 | 14,045 | [5] 7,984 | 15,195 |
| Idaho | (6) | 3,520 | (6) | 3,946 | (6) | 4,164 |
| Illinois | [7] 53,896 | 39,141 | [7] 58,979 | 43,106 | [7] 75,500 | 46,926 |
| Indiana | 44,874 | 21,158 | 46,077 | 22,996 | 53,387 | 25,059 |
| Iowa | | 17,855 | | 18,784 | | 20,239 |
| Kansas | [8] 34,639 | 14,202 | [8] 37,914 | 15,238 | [8] 40,970 | 16,186 |
| Kentucky | [9] 8,178 | 9,761 | [9] 9,763 | 10,809 | [9] 10,694 | 11,692 |
| Louisiana | [3] 53,615 | 8,961 | [3] 63,143 | 9,917 | [3] 71,670 | 10,475 |
| Maine | | 4,395 | | 4,776 | | 4,998 |
| Maryland | (5) | 9,055 | (5) | 9,949 | (5) | 10,572 |
| Massachusetts | [10] 2,865 | 17,863 | [10] 3,606 | 19,543 | [10] 3,803 | 20,619 |
| Michigan | 8,998 | 34,650 | 10,632 | 38,605 | 11,879 | 41,034 |
| Minnesota | (7) | 16,949 | (7) | 18,182 | (7) | 19,604 |
| Mississippi | (3) | 7,264 | (3) | 8,021 | (3) | 8,594 |
| Missouri | (8) | 19,404 | (8) | 21,358 | (8) | 23,435 |
| Montana | 4,242 | 4,172 | 4,042 | 4,482 | 4,545 | 4,860 |
| Nebraska | (8) | 7,796 | (8) | 8,794 | (8) | 9,562 |
| Nevada | | 1,424 | | 1,520 | | 1,558 |
| New Hampshire | | 2,469 | | 2,697 | | 2,862 |
| New Jersey | 28,615 | 22,267 | 32,555 | 24,454 | 34,651 | 26,393 |
| New Mexico | 1,905 | 3,899 | 1,845 | 4,274 | 2,303 | 4,664 |
| New York | 9,792 | 46,328 | 9,446 | 50,509 | 8,858 | 54,359 |
| North Carolina | | 15,154 | | 16,689 | | 18,161 |
| North Dakota | | 5,434 | | 5,664 | | 5,965 |
| Ohio | 35,125 | 38,757 | 34,179 | 42,259 | 35,847 | 46,486 |
| Oklahoma | 36,463 | 12,492 | 39,667 | 13,840 | 43,861 | 14,637 |
| Oregon | | 9,066 | | 10,315 | | 11,258 |
| Pennsylvania | 60,662 | 39,559 | 64,238 | 43,189 | 69,446 | 46,937 |
| Rhode Island | (10) | 3,229 | (10) | 3,516 | (10) | 3,634 |
| South Carolina | (5) | 7,426 | (5) | 8,315 | (5) | 9,188 |
| South Dakota | | 4,992 | | 5,364 | | 6,074 |
| Tennessee | (9) | 11,827 | (9) | 12,534 | (9) | 13,987 |
| Texas | 225,693 | 53,908 | 243,934 | 55,393 | 275,812 | 63,447 |
| Utah | (6) | 3,573 | (6) | 3,958 | (6) | 4,240 |
| Vermont | | 1,840 | | 2,033 | | 2,151 |
| Virginia | | 13,367 | | 14,575 | | 16,105 |
| Washington | (4) | 12,562 | (4) | 13,765 | (4) | 14,739 |
| West Virginia | 2,299 | 6,212 | 2,206 | 6,873 | 2,616 | 8,070 |
| Wisconsin | (7) | 17,592 | (7) | 19,217 | (7) | 20,894 |
| Wyoming | [6] 12,715 | 2,253 | [6] 14,841 | 2,550 | [6] 17,229 | 2,876 |
| Total | 748,411 | 716,111 | 814,841 | 779,351 | 895,913 | 846,001 |

[1] Subject to revision.
[2] American Petroleum Institute.
[3] Alabama and Mississippi included with Louisiana.
[4] Washington included with California.
[5] Maryland and South Carolina included with Georgia.
[6] Idaho and Utah included with Wyoming.
[7] Minnesota and Wisconsin included with Illinois.
[8] Missouri and Nebraska included with Kansas.
[9] Tennessee included with Kentucky.
[10] Rhode Island included with Massachusetts.
[11] Gasoline, naphtha, and blended natural gasoline.

blended or used outside refineries; and the consumption figure, while including military deliveries, was 25,000,000 barrels less than the total domestic demand figure for 1948.

In 1948 the refinery production figure amounted to 895.9 million barrels and the consumption figure by States to 846.0 million barrels. The production figure includes a considerable part of the gasoline for export and also a considerable volume of gasoline added to storage in 1948.

The Gulf Coast States were the largest surplus producers of gasoline in 1948, with a refinery output of about 348,000,000 barrels and a consumption of only 94,000,000. The surplus of 254,000,000 barrels give rise to the Gulf to east coast tanker movement (amounting to 146,000,000 barrels in 1948), to some of the largest pipeline movements to the Middle Western States and to a major part of the gasoline exports.

The Atlantic Coast States produced only 125,000,000 barrels in 1948 but consumed 265,000,000 with a deficit of 140,000,000 barrels, primarily supplied by the Gulf to east coast tanker movement.

The outstanding development in the 30-year consumption of motor fuel on and off the Nation's highways is the rapid growth of nonhighway consumption. (See table B–17.) It multiplied fifty-three-fold during this period. Highway consumption rose to only 12 times its 1919 usage. In 1919 nonhighway usage constituted less than 3 percent of total usage; in 1949, it accounted for more than 10 percent.

TABLE B–17.—*Analysis of motor fuel consumption in the United States, 1919–49*[1]

[Does not include exports or Federal purchases for military use]

| Year | Private and commercial use | Public use | Summary of total usage | | | Losses allowed for evaporation, handling, etc. | Total quantity consumed |
|---|---|---|---|---|---|---|---|
| | | | Highway | Nonhighway | Total | | |
| | *1,000 gallons* | *1,000 gallons* | *1,000 gallons* | *1,000 gallons* | *1,000 gallons* | *1,000 gallons* | *1,000 gallons* |
| 1919 | 2,680,230 | 66,800 | 2,672,000 | 75,030 | 2,747,030 | | 2,747,030 |
| 1920 | 3,366,187 | 81,977 | 3,346,000 | 102,164 | 3,448,164 | | 3,448,164 |
| 1921 | 3,970,778 | 94,046 | 3,935,000 | 129,824 | 4,064,824 | | 4,064,824 |
| 1922 | 4,900,756 | 113,279 | 4,841,000 | 173,035 | 5,014,035 | | 5,014,035 |
| 1923 | 6,173,991 | 139,186 | 6,078,000 | 235,177 | 6,313,177 | | 6,313,177 |
| 1924 | 7,640,504 | 168,682 | 7,497,000 | 312,186 | 7,809,186 | | 7,809,186 |
| 1925 | 8,951,448 | 192,517 | 8,749,075 | 394,890 | 9,143,965 | | 9,143,965 |
| 1926 | 10,336,878 | 215,283 | 10,063,951 | 488,210 | 10,552,161 | | 10,552,161 |
| 1927 | 11,699,434 | 237,462 | 11,331,326 | 605,570 | 11,936,896 | | 11,936,896 |
| 1928 | 12,835,041 | 255,241 | 12,361,460 | 728,822 | 13,090,282 | | 13,090,282 |
| 1929 | 14,770,117 | 280,919 | 14,139,301 | 911,735 | 15,051,036 | | 15,051,036 |
| 1930 | 15,477,960 | 299,747 | 14,753,911 | 1,023,796 | 15,777,707 | | 15,777,707 |
| 1931 | 16,313,744 | 307,517 | 15,456,662 | 1,164,599 | 16,621,261 | 90,438 | 16,711,699 |
| 1932 | 15,100,789 | 326,551 | 14,339,151 | 1,088,189 | 15,427,340 | 89,377 | 15,516,717 |
| 1933 | 15,018,711 | 349,194 | 14,348,152 | 1,019,753 | 15,367,905 | 114,839 | 15,482,744 |
| 1934 | 16,120,696 | 437,225 | 15,414,896 | 1,143,025 | 16,557,921 | 202,780 | 16,760,701 |
| 1935 | 17,128,944 | 508,636 | 16,344,697 | 1,292,883 | 17,637,580 | 216,899 | 17,854,479 |
| 1936 | 19,000,445 | 561,232 | 18,099,138 | 1,462,539 | 19,561,677 | 237,944 | 19,799,621 |
| 1937 | 20,522,719 | 592,725 | 19,455,454 | 1,659,990 | 21,115,444 | 259,253 | 21,374,697 |
| 1938 | 20,702,520 | 609,155 | 19,611,643 | 1,700,032 | 21,311,675 | 325,636 | 21,537,311 |
| 1939 | 21,911,805 | 660,032 | 20,714,352 | 1,857,485 | 22,571,837 | 344,649 | 22,916,486 |
| 1940 | 23,324,299 | 714,226 | 22,001,356 | 2,037,169 | 24,038,525 | 365,809 | 24,404,334 |
| 1941 | 25,712,731 | 716,710 | 24,192,397 | 2,237,044 | 26,429,441 | 290,677 | 26,720,118 |
| 1942 | 21,830,913 | 608,012 | 19,939,887 | 2,499,038 | 22,438,925 | 253,572 | 22,692,497 |
| 1943 | 18,195,962 | 446,811 | 16,004,250 | 2,638,523 | 18,642,773 | 228,649 | 18,871,422 |
| 1944 | 18,837,161 | 454,886 | 16,429,668 | 2,862,379 | 19,292,047 | 231,505 | 19,523,552 |
| 1945 | 21,575,537 | 471,190 | 19,148,968 | 2,897,759 | 22,046,727 | 257,028 | 22,303,755 |
| 1946 | 28,381,900 | 494,646 | 25,648,998 | 3,227,548 | 28,876,546 | 324,919 | 29,201,465 |
| 1947 | 31,029,825 | 650,676 | 28,215,705 | 3,464,796 | 31,680,501 | 355,385 | 32,035,886 |
| 1948 | 33,615,771 | 713,376 | 30,460,641 | 3,868,506 | 34,329,147 | 377,812 | 34,706,959 |
| 1949 | 35,690,091 | 749,946 | 32,431,016 | 4,009,021 | 36,440,037 | 395,217 | 36,835,254 |

[1] The data in this table were obtained chiefly from reports of State authorities. For years prior to 1930 or where data were not available, estimates have been made by Public Roads Administration.

Source: Bureau of Public Roads, Department of Commerce.

## SALES OF FUEL OIL AND KEROSENE IN 1949 [1]

Sales of both light and heavy fuel oils declined nominally in 1949 compared with 1948 while the market for kerosene was considerably lower, according to a survey of distributors' deliveries made by the Petroleum and Natural Gas Branch, Fuels and Explosives Division, Bureau of Mines, United States Department of the Interior. The domestic market for distillate fuel oil, including Diesel oil, was lower by 4 percent from a revised total of 341,973,000 barrels in 1948 to 329,196,000 in 1949, while sales of residual grades of 498,913,000 barrels in 1949 were about 2 percent below the 1948 revised total of 506,497,000 barrels. Sales of kerosene of 102,661,000 barrels were 9 percent under 1948 requirements of 112,487,000 barrels.

As dollar exchange difficulties have arisen and as petroleum refineries in war-torn countries have been rebuilt or added to, there has been a pronounced decline in exports of kerosene and distillate fuel oil. The foreign demand for light fuel oils has dropped from a wartime peak of 43,491,000 barrels in 1944 to 21,293,000 in 1948 and 12,189,000 in 1949, while the total for kerosene has shrunk from 8,637,000 barrels in 1946 to 3,495,000 in 1948 and to 2,532,000 in 1949. Conversely, the export market for heavy grades of fuel oil has not varied greatly in recent years, however, the 1949 total of 12,641,000 barrels was slightly below the 1948 demand of 13,011,000 barrels.

Most of the demands for light fuel oils showed declines in 1949, which is in contrast to the market in 1948, when all requirements registered gains. The losses in the various uses ranged from a shrinkage by a third in military purchases down to a 5 percent decline for heating oils. Deliveries of distillate fuel oil to the military forces, which have fallen off since World War II, except for a gain in 1948, turned downward again in 1949. Sales of light fuel oil to the gas and electric power companies declined by 16 percent in 1949 compared with 1948, as these utilities turned more to the heavy grades for their fuel-oil requirements. Vessels handling a lower export tonnage purchased about 10 percent less light fuel oil for bunkers in 1949 than in 1948, while the quantity sold to the heavy industries—smelters, mines, and manufacturing plants—in 1949 was 12 percent below the 1948 total. Deliveries of light fuel oils for space heating, which make up about three-fifths of the total sales, declined by 5 percent due largely to milder weather in 1949, while No. 1 fuel oil sold as range oil in 1949 was about 9 percent below the 1948 volume. These various losses were partly counterbalanced by a 25 percent gain in sales of light fuel oils, mostly Diesel grades, to the railroads and a 14 percent greater use of distillate fuel oil by the oil companies in their various operations. Distillate fuel oils sold for miscellaneous uses gained slightly in volume in 1949 over 1948.

[1] Bureau of Mines Report No. MMS 1907, September 27, 1950.

TABLE B–18.—*Sales of distillate fuel oil, 1945–49, by uses*

[Thousands of barrels of 42 gallons]

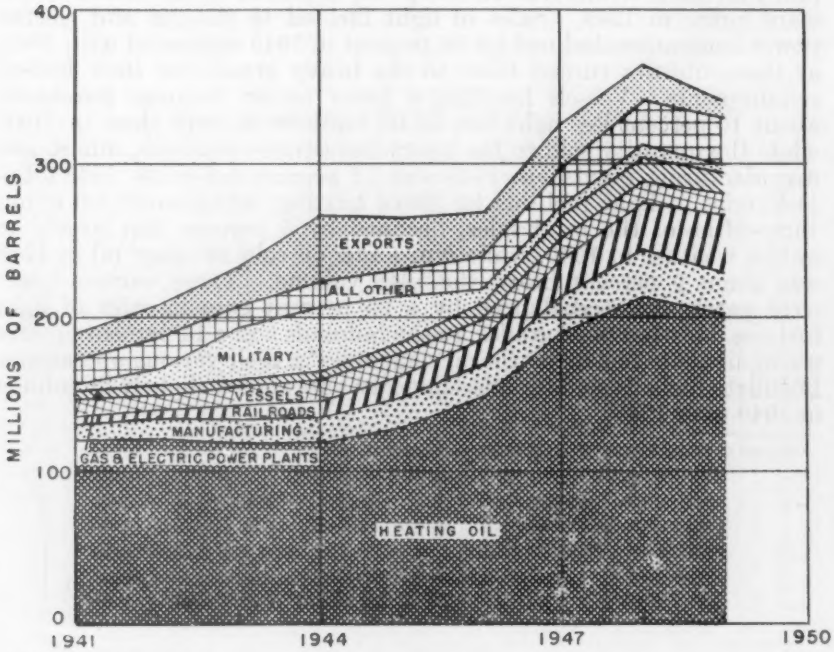
| Uses | 1945 | 1946 | 1947 | 1948 | 1949 | Percent change 1949 to 1948 |
|---|---|---|---|---|---|---|
| Railroads | 14,458 | 17,570 | 23,619 | 31,006 | 38,604 | +24.5 |
| Vessels (including tankers) | 14,130 | 12,064 | 14,475 | 14,511 | 13,121 | −9.6 |
| Gas and electric power plants | 6,824 | 10,581 | 14,216 | 14,856 | 12,550 | −15.5 |
| Smelters, mines, and manufacturing industries | 19,071 | 21,317 | 24,489 | 29,932 | 26,424 | −11.7 |
| Heating oils | 121,342 | 139,637 | 178,359 | 200,024 | 190,387 | −4.8 |
| No. 1 fuel oil sold as range oil | 7,481 | 8,459 | 11,632 | 13,534 | 12,279 | −9.3 |
| Military uses (U. S. Army, Navy, Air Force, and Coast Guard) | 30,366 | 9,385 | 5,176 | [1] 9,071 | 6,109 | −32.7 |
| Oil company fuel | 1,128 | 1,890 | 2,191 | 3,625 | 4,151 | +14.2 |
| Miscellaneous uses | 16,825 | 18,647 | 23,857 | 25,414 | 25,571 | +.6 |
| Total, United States | 231,625 | 239,550 | 298,014 | [1] 341,973 | 329,196 | −3.7 |
| Export and shipments | 33,496 | 29,487 | 29,877 | 21,293 | 12,189 | −42.8 |
| Grand total | 265,121 | 269,037 | 327,891 | [1] 363,266 | 341,385 | −6.0 |

[1] Revised.

TABLE B–19.—*Sales of distillate fuel oil by uses on a percentage basis, 1945–49*

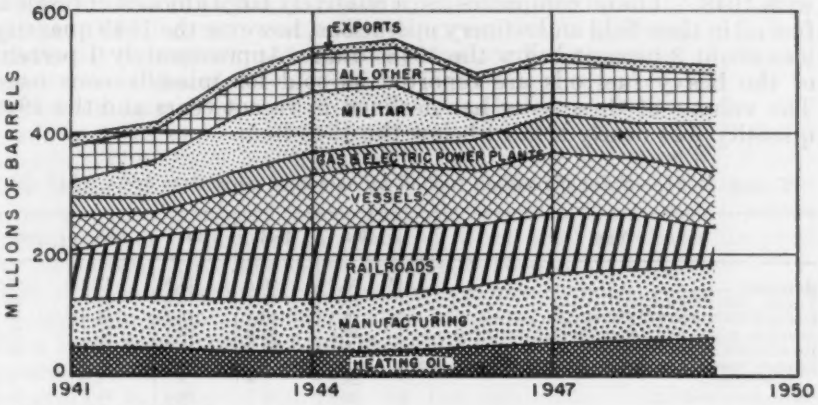
| Uses | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|
| Railroads | 6.2 | 7.3 | 7.9 | 9.1 | 11.7 |
| Vessels (including tankers) | 6.1 | 5.1 | 4.9 | 4.2 | 4.0 |
| Gas and electric power plants | 3.0 | 4.4 | 4.8 | 4.3 | 3.8 |
| Smelters, mines, and manufacturing industries | 8.2 | 8.9 | 8.2 | 8.7 | 8.0 |
| Heating oils | 52.4 | 58.3 | 59.9 | 58.5 | 57.8 |
| No. 1 fuel oil sold as range oil | 3.2 | 3.5 | 3.9 | 4.0 | 3.7 |
| Military uses (U. S. Army, Navy, Air Force, and Coast Guard) | 13.1 | 3.9 | 1.7 | 2.7 | 1.9 |
| Oil company fuel | .5 | .8 | .7 | 1.1 | 1.3 |
| Miscellaneous uses | 7.3 | 7.8 | 8.0 | 7.4 | 7.8 |
| Total, United States | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

FIGURE B–8.—SALES OF DISTILLATE FUEL OILS BY USES, 1941–49.




Source: Bureau of Mines.

FIGURE B–9.—SALES OF RESIDUAL FUEL OIL BY USES, 1941–49.




Source: Bureau of Mines.

Gains in sales of residual fuel oils in some of the big-volume items were almost sufficient to make up for the losses reported in the other uses. Higher prices for coal in 1949 in contrast to greatly reduced quotations for heavy fuel oil and interruptions in the coal supply caused some important industrial consumers to change over to oil fuel. Gas and electric power plants turned strongly to heavy fuel oils in 1949, when the total reported for these utilities was not only a record but was also 41 percent over 1948 requirements. Heavy fuel oil delivered to smelters, mines, and manufacturing industries, which constitute about a quarter of the market, were up by 4 percent in 1949 over the 1948 total, while there was also a 3 percent gain in volume for heavy grades of heating oils in 1949. The railroads in their pronounced switch to Diesel oil for fuel in recent years have continuously curtailed their purchases of heavy fuel oil and 1949 requirements were 29 percent below the 1948 total. Residual fuel oil sold to vessels for bunker fuel and the quantity credited to military uses were lower by 7 and 8 percent, respectively, in 1949 compared

TABLE B–20.—*Sales of residual fuel oil, 1945–49, by uses*

[Thousands of barrels of 42 gallons]

| Uses | 1945 | 1946 | 1947 | 1948 | 1949 | Percent change 1949 to 1948 |
|---|---|---|---|---|---|---|
| Railroads | 112,297 | 100,305 | 97,500 | 89,588 | 63,467 | −29.2 |
| Vessels (including tankers) | 100,365 | 88,185 | 101,900 | 95,763 | 89,362 | −6.7 |
| Gas and electric power plants | 34,532 | 50,921 | 60,964 | 56,812 | 80.092 | +41.0 |
| Smelters, mines, and manufacturing industries | 91,176 | 99,011 | 115,108 | 117,780 | 122,633 | +4.1 |
| Heating oils | 43,874 | 49,734 | 56,402 | 58,639 | 60,414 | +3.0 |
| Military uses (U. S. Army, Navy, Air Force, and Coast Guard) | 97,485 | 35,822 | 19,147 | [1] 24,655 | 22,724 | −7.8 |
| Oil company fuel | 57,336 | 58,054 | 62,649 | 56,637 | 55,647 | −1.7 |
| Miscellaneous uses | 5,200 | 5,028 | 6,859 | 6,623 | 4,574 | −30.9 |
| Total, United States | 542,265 | 487,060 | 520,529 | [1] 506,497 | 498,913 | −1.5 |
| Exports and shipments | 11,669 | 9,188 | 10,623 | 13,011 | 12,641 | −2.8 |
| Grand total | 553,934 | 496,248 | 531,152 | [1] 519,508 | 511,554 | −1.5 |

[1] Revised.

with 1948. The oil companies use a relatively large amount of residual fuel oil in their field and refinery operations, however the 1949 quantity was about 2 percent below the 1948 total. Approximately 1 percent of the heavy fuel oils are reported as sold for miscellaneous uses. The volume of these sales has declined in recent years and the 1949 quantity was nearly a third below the 1948 item.

TABLE B–21.—*Sales of residual fuel oil by uses on a percentage basis, 1945–49*

| Uses | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|
| Railroads | 20.7 | 20.6 | 18.8 | 17.7 | 12.7 |
| Vessels (including tankers) | 18.5 | 18.1 | 19.6 | 18.9 | 17.9 |
| Gas and electric power plants | 6.4 | 10.5 | 11.7 | 11.2 | 16.1 |
| Smelters, mines, and manufacturing industries | 16.8 | 20.3 | 22.1 | 23.3 | 24.6 |
| Heating oils | 8.1 | 10.2 | 10.8 | 11.5 | 12.1 |
| Military uses (U. S. Army, Navy, Air Force, and Coast Guard) | 18.0 | 7.4 | 3.7 | 4.9 | 4.6 |
| Oil company fuel | 10.6 | 11.9 | 12.0 | 11.2 | 11.1 |
| Miscellaneous uses | .9 | 1.0 | 1.3 | 1.3 | .9 |
| Total United States | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Demand in 1950*

A review of the indicated demand for kerosene, light and heavy fuel oils during the first 6 months of 1950 as taken from the Monthly Petroleum Statement for June 1950, shows that domestic requirements for these liquid fuels were up sharply in 1950 compared with the same period of 1949. The indicated demand for kerosene in the first two quarters of 1950 of 56,899,000 barrels is 16 percent above the comparative total of 49,182,000 for 1949, while the domestic demand for light fuel oils, with a colder first quarter in 1950 and with nearly a 70-percent increase in the shipments of domestic oil burners, expanded by nearly 21 percent from 165,186,000 barrels in the first half of 1949 to 199,105,000 in the same period of 1950. The demand for heavy grades of fuel oil increased by 13 percent from 243,692,000 barrels in the first two quarters of 1949 to 274,616,000 in the corresponding part of 1950.

The export market for both kerosene and distillate fuel oil have continued a downward trend in 1950, while foreign requirements for heavy grades have increased. Exports of kerosene in the first 6 months of 1950 of 941,000 barrels are 43 percent below the comparative total of 1,654,000 in 1949. The drop in light fuel oil shipments abroad has been somewhat less pronounced—an 18-percent decline—or from 7,377,000 barrels for the first half of 1949 to 6,046,000 in the same period of 1950. Exports of heavy fuel oil have expanded by 26 percent from 6,432,000 barrels in the opening quarter of 1949 to 8,074,000 from January through June 1950.

It is believed that the kerosene exported in 1950 will total 1.5 million barrels compared with 2.5 million in 1949 and 3.5 million barrels in 1948; that foreign shipments of distillate fuel oil will be approximately 11 million barrels in 1950, which continues the downward trend from 21.3 million barrels in 1948 and 12.2 million in 1949; and that there will be an increase in the exports of residual fuel oils in 1950 to 16.0 million barrels compared with 12.6 million in 1949 and 13 million barrels in 1948.

*Railroads*

The trend in sales of fuel oils to railroads in 1949 continued to follow the pattern of recent years when their purchases of diesel fuel have continued to expand and their demand for heavy grades of fuel oil has declined sharply as a result. Distributers reported the sale of 38,604,000 barrels of light fuel oils—mostly diesel fuel—to the railroads in 1949 or a quarter more than the 1948 total of 31,006,000 barrels. The Diesel fuel included in these items increased by 26 percent from 28,576,000 barrels in 1948 to 36,053,000 in 1949. An 8-percent loss in sales of heavy fuel oils to railroads reported for 1948 has since been even more pronounced, when their purchases dropped by 29 percent from 89,588,000 barrels in 1948 to 63,467,000 in 1949. This shift to diesel fuel by the railroads is also reflected in the changes in their equipment, as the number of diesel locomotives increased by a third from 8,089 in 1948 to 10,888 in 1949 and their oil-burning locomotives in use declined from 6,124 to 5,531 in the same interval according to records compiled by the Interstate Commerce Commission. This rapid dieselization of the railroads in recent years has in turn also greatly lessened their use of bituminous coal, the consumption of which by class I roads, has declined, according to the Association of American Railroads, from a "peak" of 132 million tons in 1944 to 95 million in 1948 and 68 million tons in 1949.

The change in requirements for different grades of fuel oil by the railroads can be presented in still another way. Light fuel oils, including Diesel fuel, sold to the railroads, have increased from 6 percent of the total domestic market in 1945 to 9 percent in 1948 and to 12 percent in 1949, while conversely requirements for residual fuel oil, have declined from 21 percent of total sales in 1945 to an 18-percent proportion in 1948 and to 13 percent in 1949.

About 30 percent of the diesel fuel sold to railroads is reported from the North Central States, and there the quantity increased by a quarter from 8,428,000 barrels in 1948 to 10,584,000 in 1949. Railroads operating in the South Central area bought about a fifth of the national total or 5,931,000 barrels in 1948 and 7,061,000 in 1949—a gain of 19 percent. Fuel-oil dealers in the Pacific Coast States sold 3,437,000 barrels of Diesel fuel to the railroads in 1948 and 4,334,000 in 1949—a 26-percent gain. In 1948 and 1949 the Middle Atlantic States have out-ranked the California marketing area in railroad requirements for Diesel fuel, and sales of this fuel there have expanded by nearly a third from 4,039,000 barrels in 1948 to 5,280,000 in 1949. Relatively lesser quantities of Diesel fuel are sold to the railroads operating in other parts of the country. The deliveries in the South Atlantic and Rocky Mountain areas were up by a third in 1949 compared with 1948, while sales in the New England States were a fifth greater in 1949.

All areas reported greatly reduced quantities of heavy fuel as sold to the railroads in 1949. Nearly a half of the total is credited to the South Central States and there the demand was lower by 30 percent or from 43,150,000 barrels in 1948 to 30,126,000 in 1949. Approximately a third of the market for this type of railroad fuel is found on the Pacific coast, where requirements slumped by a third from 32,910,000 barrels in 1948 to 21,752,000 in 1949. The only other areas where important quantities of heavy fuel oil are sold to the railroads is the Rocky Mountain States, and there sales declined from 8,895,000 barrels in 1948 to 7,756,000 in 1949.

TABLE B–22.—*Sales of distillate and residual fuel oils in 1949*

[Thousands of barrels of 42 gallons]

TO RAILROADS

| | Distillate fuels | | | | Residual | |
|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Total 1949 | Total 1948 | Total 1949 | Total 1948 |
| California | 2,511 | 14 | 2,525 | 2,348 | 13,300 | 18,655 |
| Oregon | 254 | | 254 | 139 | 5,170 | 7,440 |
| Washington | 592 | | 592 | 541 | 1,474 | 2,071 |
| Arizona | 40 | | 40 | 40 | 536 | 670 |
| Nevada | 937 | | 937 | 380 | 1,272 | 4,074 |
| Idaho | 145 | 11 | 156 | 99 | 136 | 276 |
| Montana | 837 | 15 | 852 | 586 | 3,297 | 4,640 |
| Wyoming | 726 | 19 | 745 | 638 | 1,838 | 2,697 |
| Utah | 530 | 8 | 538 | 375 | 1,922 | 341 |
| Colorado | 596 | 10 | 606 | 511 | 224 | 447 |
| New Mexico | 332 | 1 | 333 | 294 | 339 | 494 |
| North Dakota | 245 | 13 | 258 | 210 | 325 | 418 |
| South Dakota | 135 | 4 | 139 | 99 | 95 | 113 |
| Minnesota | 766 | 69 | 835 | 577 | 177 | 160 |
| Nebraska | 570 | 22 | 592 | 522 | 70 | 118 |
| Iowa | 1,352 | | 1,352 | 1,307 | 614 | 410 |
| Wisconsin | 467 | 32 | 499 | 371 | 108 | 81 |
| Illinois | 3,135 | 151 | 3,286 | 2,677 | 399 | 617 |
| Indiana | 577 | 63 | 640 | 498 | 103 | 59 |
| Michigan | 493 | 43 | 536 | 297 | 154 | 204 |
| Ohio | 1,544 | 247 | 1,791 | 1,490 | 20 | 59 |
| Kentucky | 324 | 52 | 376 | 308 | 36 | 56 |
| Tennessee | 976 | 72 | 1,048 | 735 | 177 | 183 |
| Missouri | 1,115 | 30 | 1,145 | 974 | 1,191 | 1,798 |
| Kansas | 1,168 | 35 | 1,203 | 1,236 | 4,627 | 7,410 |
| Texas | 2,023 | 43 | 2,066 | 1,871 | 17,978 | 23,674 |
| Oklahoma | 827 | 15 | 842 | 787 | 3,548 | 5,173 |
| Arkansas | 563 | 182 | 745 | 545 | 1,268 | 1,996 |
| Louisiana | 627 | 2 | 629 | 628 | 1,389 | 2,954 |
| Mississippi | 195 | 11 | 206 | 205 | 75 | 83 |
| Alabama | 543 | | 543 | 497 | 50 | 62 |
| Maine | 248 | 4 | 252 | 220 | | |
| New Hampshire | 42 | 7 | 49 | 35 | 5 | 2 |
| Vermont | 23 | 4 | 27 | 20 | | |
| Massachusetts | 689 | 97 | 786 | 594 | 95 | 112 |
| Rhode Island | 24 | | 24 | 21 | 35 | 25 |
| Connecticut | 621 | 1 | 622 | 556 | 27 | 116 |
| New York | 1,964 | 79 | 2,043 | 1,635 | 209 | 198 |
| New Jersey | 588 | 60 | 648 | 365 | 152 | 150 |
| Pennsylvania | 1,941 | 998 | 2,939 | 1,755 | 136 | 220 |
| Delaware | 4 | | 4 | 3 | | |
| Maryland | 479 | 51 | 530 | 443 | 59 | 56 |
| District of Columbia | 304 | 51 | 355 | 305 | 1 | |
| Virginia | 833 | 14 | 847 | 665 | 261 | 299 |
| West Virginia | 12 | 5 | 17 | 16 | 2 | 2 |
| North Carolina | 917 | 4 | 921 | 694 | 7 | 14 |
| South Carolina | 411 | | 411 | 396 | 2 | 7 |
| Georgia | 862 | 11 | 873 | 696 | 21 | 14 |
| Florida | 946 | 1 | 947 | 802 | 543 | 940 |
| Total United States, 1949 | 36,053 | 2,551 | 38,604 | | 63,467 | |
| Total United States, 1948 | 28,576 | 2,430 | | 31,006 | | 89,588 |

*Vessels*

Sales of both light and heavy fuel oil to vessels declined in 1949. The light oil total—including diesel grades—was lower by 10 percent from 14,511,000 barrels in 1948 to 13,121,000 in 1949. Light diesel fuel, included in these totals dropped from 13,728,000 barrels in 1948 to 12,385,000 in 1949. Vessel requirements for residual bunkering grades were 95,763,000 barrels in 1948 and 89,362,000 in 1949—a shrinkage of 7 percent. There is some heavy diesel fuel used by vessels and distributors were asked to break this out of the residual oil total in the 1949 survey of sales. The quantity of this heavy diesel fuel reported for 1949 was 2,718,000 barrels.

The Bureau of the Census, Department of Commerce, reports the quantities of bunker oil sold to vessels engaged in foreign trade. Their statistics show 6,236,000 barrels of light diesel fuel for 1948 and 6,013,000 in 1949 as delivered to vessels, while requirements for heavy grades were 54,825,000 barrels in 1948 and 50,169,000 in 1949. If these items are deducted from the totals reported in the Bureau of Mines survey, the difference represents the demand for bunker oil by vessels using coastwise and inland waterways. The calculation indicates that vessels of that class apparently purchased 6,372,000 barrels of light diesel fuel in 1949 compared with 7,492,000 in 1948, and that they loaded 39,193,000 barrels of heavy grades for bunkers in 1949 against 40,938,000 in 1948.

Approximately 40 percent of the light diesel fuel sold to vessels is reported from the Atlantic coast area, and there the demand declined by 7 percent from 5,707,000 barrels in 1948 to 5,282,000 in 1949. Another 30 percent of the light diesel oil delivered for bunker fuel is credited to the South Central States, which includes the Gulf coast. Sales to vessels in that area dropped from 4,161,000 barrels in 1948 to 3,726,000 in 1949, while on the Pacific coast the market for ships' diesel fuel was lower by 13 percent or from 3,299,000 barrels in 1948 to 2,871,000 in 1949.

Heavy bunker oil sold to vessels at Gulf ports represents about 40 percent of the national total, and there the loadings declined from 39,997,000 barrels in 1948 to 35,361,000 in 1949. Similar quantities of heavy oil bunkers are reported for the Atlantic Coast States, where the demand was 35,434,000 barrels in 1949 compared with 37,665,000 in 1948. There was a slight gain in the market for heavy oil bunkers at Pacific coast ports from 17,257,000 barrels in 1948 to 17,586,000 in 1949. An unusual increase in tanker shipments of refined petroleum products from California to the east coast (7,566,000 barrels in 1949 compared with 2,088,000 in 1948) was probably a factor which helped to maintain the need for residual oil bunkers.

TABLE B–23.—*Sales of distillate and residual fuel oils in 1949*

[Thousands of barrels of 42 gallons]

TO VESSELS (INCLUDING TANKERS)

| | Distillate fuels | | | | Residual | | | |
|---|---|---|---|---|---|---|---|---|
| | Diesel | Other light | Total 1949 | Total 1948 | Heavy | Diesel | Total 1949 | Total 1948 |
| California | 2,222 | | 2,222 | 2,666 | 15,349 | | 15,349 | 15,305 |
| Oregon | 165 | | 165 | 117 | 1,030 | | 1,030 | 717 |
| Washington | 484 | 1 | 485 | 525 | 1,207 | | 1,207 | 1,235 |
| Idaho | | 1 | 1 | | | | | |
| Utah | | | | | 21 | | 21 | |
| South Dakota | | | | | 1 | | 1 | |
| Minnesota | | | | 23 | 30 | | 30 | 34 |
| Iowa | | | | 6 | | | | |
| Wisconsin | | 2 | 2 | | | 1 | 1 | |
| Illinois | 282 | 2 | 284 | 240 | 100 | 3 | 103 | 113 |
| Indiana | 24 | 10 | 34 | 25 | 95 | 14 | 109 | 90 |
| Michigan | 19 | 3 | 22 | 64 | 131 | 23 | 154 | 143 |
| Ohio | 79 | 10 | 89 | 37 | 136 | 5 | 141 | 112 |
| Kentucky | 90 | 2 | 92 | 121 | 70 | | 70 | 49 |
| Tennessee | 12 | 3 | 15 | 98 | 261 | 90 | 351 | 303 |
| Missouri | 22 | | 22 | 2 | 121 | 2 | 123 | 79 |
| Texas | 1,985 | 236 | 2,221 | 2,456 | 22,293 | 208 | 22,501 | 24,446 |
| Arkansas | | 1 | 1 | 112 | | 113 | 113 | |
| Louisiana | 1,455 | 21 | 1,476 | 1,583 | 11,506 | 110 | 11,616 | 13,981 |
| Mississippi | 54 | 16 | 70 | 47 | 126 | 1 | 127 | 109 |
| Alabama | 210 | 1 | 211 | 221 | 846 | 35 | 881 | 1,322 |
| Maine | 34 | 1 | 35 | 32 | 40 | 7 | 47 | 24 |
| New Hampshire | 2 | | 2 | 1 | | | | |
| Vermont | 3 | | 3 | 2 | | | | |
| Massachusetts | 560 | 42 | 602 | 603 | 847 | 137 | 984 | 825 |
| Rhode Island | 20 | 1 | 21 | 15 | 74 | 49 | 123 | 102 |
| Connecticut | 13 | 1 | 14 | 40 | 25 | | 25 | 11 |
| New York | 2,167 | 45 | 2,212 | 2,274 | 14,036 | 392 | 14,428 | 14,202 |
| New Jersey | 1,246 | 70 | 1,316 | 1,562 | 3,425 | 802 | 4,227 | 5,774 |
| Pennsylvania | 260 | 180 | 440 | 580 | 3,399 | 567 | 3,966 | 3,782 |
| Delaware | 3 | 9 | 12 | 17 | 487 | 2 | 489 | 18 |
| Maryland | 458 | 45 | 503 | 341 | 4,553 | 11 | 4,564 | 5,225 |
| District of Columbia | 1 | 1 | 2 | 3 | 5 | | 5 | 6 |
| Virginia | 280 | 22 | 302 | 287 | 4,632 | 9 | 4,641 | 5,695 |
| West Virginia | 5 | | 5 | 6 | 2 | 1 | 3 | 30 |
| North Carolina | 7 | | 7 | 20 | 17 | 13 | 30 | 26 |
| South Carolina | 13 | | 13 | 69 | 745 | 18 | 763 | 1,110 |
| Georgia | | | | 20 | 331 | 21 | 352 | 290 |
| Florida | 210 | 10 | 220 | 296 | 703 | 84 | 787 | 545 |
| Total United States 1949 | 12,385 | 736 | 13,121 | | 86,644 | 2,718 | 89,362 | |
| Total United States 1948 | 13,728 | 783 | | 14,511 | 95,763 | (1) | | 95,763 |

[1] Not available.

*Gas and electric power plants*

An ample supply of heavy fuel oil at unusually low prices in contrast to a short supply of coal due to labor troubles coupled with higher prices forced the public utilities to turn strongly to oil fuel in 1949. Oil companies reported the sale of 80,092,000 barrels of residual fuel oil to gas and electric power companies in 1949, a 41-percent gain over the 1948 total of 56,812,000 barrels. These same utilities use relatively smaller amounts of light fuel oils and their purchases of these grades declined from 14,856,000 in 1948 to 12,550,000 in 1949. The heavy fuel oil credited to the gas and electric companies expanded from 11 percent of the national total in 1948 to a 16-percent share in

1949, while the proportion for the light fuel oils was about 4 percent of all requirements for both years.

The quantities of light and heavy fuel oils as consumed separately by the manufactured-gas and electric-power companies are found in statistics released by the American Gas Association and the Federal Power Commission. The gas companies used 5,829,000 barrels of light fuel oil and 20,632,000 of heavy grades in 1949 compared with 8,145,000 barrels of light and 22,950,000 of residual in 1948, while consumption totals for the electric-power companies were 6,075,000 barrels of distillates plus 36,570,000 of heavy grades in 1948 and 6,033,000 barrels of light and 60,269,000 of residual fuel oil in 1949. The coal consumed for the production of electric energy declined from 99,586,000 short tons in 1948 to 84,072,000 in 1949, while the natural gas used for the same purpose mounted from 478,097 millions of cubic feet in 1948 to 549,889 in 1949 according to the Federal Power Commission.

Smaller quantities of light fuel oils were purchased by gas and electric power companies in all sections of the country in 1949 than in 1948 except in the Pacific coast and New England regions. Sales to the utilities in New England mounted by 7 percent from 1,716,000 barrels in 1948 to 1,830,000 in 1949, while totals for the Pacific coast were 372,000 barrels of distillate fuel oil in 1948 and 461,000 in 1949. About 32 percent of the distillate grades were reported from the North Central States and there the decline in demand was about 19 percent or from 4,902,000 barrels in 1948 to 3,992,000 in 1949. Similar quantities are sold to the gas and electric power companies operating in the Middle Atlantic States, and there requirements declined from 4,290,000 barrels in 1948 to 3,455,000 in 1949—a shrinkage by a fifth. The light fuel-oil total for the South Central area in 1949, 1,407,000 barrels, was a third less than the 1948 item of 2,124,000, while the declines for the South Atlantic and Rocky Mountain States were less pronounced.

Huge gains were reported in the sale of heavy fuel oils to the gas and electric power companies in all parts of the country except for a decline in the South Central States where the quantities are relatively small. The power companies in New England doubled their purchases of heavy fuel oil from 7,965,000 barrels in 1948 to 15,958,000 in 1949, while there were 50-percent gains in the Middle Atlantic (31,381,000 barrels in 1949 compared with 20,530,000 in 1948) and North Central States—1,855,000 barrels in 1949 against 1,233,000 in 1948. The utilities in the Pacific coast area buy about a quarter of the national total for these heavy oils and deliveries there increased by 13 percent from 16,621,000 in 1948 to 18,782,000 in 1949. The volume of sales in the South Atlantic States was up by a fifth from 8,842,000 barrels in 1948 to 10,641,000 in 1949. Quantities of residual fuel oil sold to the utilities in the Rocky Mountain area are trivial, however there was a substantial gain in the 1949 total.

TABLE B-24.—*Sales of distillate and residual fuel oils in 1949*

[Thousands of barrels of 42 gallons]

TO GAS AND ELECTRIC POWER PLANTS

| | Distillate fuels | | | | Residual | |
|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Total 1949 | Total 1948 | Total 1949 | Total 1948 |
| California | 308 | 5 | 313 | 129 | 13,930 | 12,167 |
| Oregon | 28 | 1 | 29 | 100 | 3,209 | 2,929 |
| Washington | 62 | | 62 | 69 | 1,546 | 1,362 |
| Arizona | 24 | 15 | 39 | 56 | 97 | 163 |
| Nevada | 18 | | 18 | 18 | | |
| Idaho | 6 | | 6 | 8 | 7 | |
| Montana | 13 | 7 | 20 | 17 | 5 | 1 |
| Wyoming | 11 | 2 | 13 | 37 | 14 | |
| Utah | 57 | 4 | 61 | 63 | | |
| Colorado | 91 | 20 | 111 | 109 | 75 | 55 |
| New Mexico | 17 | 25 | 42 | 60 | 60 | 61 |
| North Dakota | 76 | 65 | 141 | 115 | | |
| South Dakota | 210 | 10 | 220 | 226 | 32 | 30 |
| Minnesota | 315 | 105 | 420 | 425 | 125 | 91 |
| Nebraska | 286 | 9 | 295 | 286 | 72 | 71 |
| Iowa | 712 | 152 | 864 | 797 | 102 | 46 |
| Wisconsin | 460 | 56 | 516 | 658 | 78 | 89 |
| Illinois | 183 | 42 | 225 | 240 | 707 | 223 |
| Indiana | 206 | 154 | 360 | 437 | 49 | 68 |
| Michigan | 235 | 495 | 730 | 1,406 | 278 | 378 |
| Ohio | 89 | 92 | 181 | 167 | 384 | 217 |
| Kentucky | 21 | 4 | 25 | 97 | 15 | |
| Tennessee | 14 | 1 | 15 | 48 | 13 | 20 |
| Missouri | 301 | 94 | 395 | 482 | 408 | 400 |
| Kansas | 183 | 57 | 240 | 621 | 497 | 639 |
| Texas | 48 | 104 | 152 | 394 | 143 | 335 |
| Oklahoma | 259 | 25 | 284 | 217 | 157 | 28 |
| Arkansas | 130 | 20 | 150 | 147 | 1 | 6 |
| Louisiana | 127 | 6 | 133 | 205 | 105 | 95 |
| Mississippi | 43 | 1 | 44 | 50 | 1 | |
| Alabama | 9 | | 9 | 8 | 2 | 1 |
| Maine | 35 | 43 | 78 | 49 | 830 | 805 |
| New Hampshire | 33 | 95 | 128 | 92 | 452 | 350 |
| Vermont | 11 | 35 | 46 | 56 | 71 | 84 |
| Massachusetts | 28 | 885 | 913 | 977 | 7,890 | 2,490 |
| Rhode Island | 1 | 181 | 182 | 52 | 2,265 | 2,158 |
| Connecticut | 174 | 309 | 483 | 490 | 4,450 | 2,078 |
| New York | 375 | 914 | 1,289 | 2,353 | 14,683 | 10,394 |
| New Jersey | 248 | 992 | 1,240 | 935 | 10,006 | 5,572 |
| Pennsylvania | 260 | 570 | 830 | 815 | 4,443 | 2,994 |
| Delaware | 3 | 5 | 8 | 12 | 13 | 23 |
| Maryland | 63 | 21 | 84 | 81 | 1,876 | 1,506 |
| District of Columbia | 1 | 3 | 4 | 94 | 360 | 41 |
| Virginia | 195 | 169 | 364 | 379 | 412 | 290 |
| West Virginia | 4 | 4 | 8 | 18 | | |
| North Carolina | 99 | 153 | 252 | 235 | 85 | 55 |
| South Carolina | 57 | 25 | 82 | 112 | 306 | 272 |
| Georgia | 85 | 66 | 151 | 38 | 706 | 561 |
| Florida | 235 | 60 | 295 | 376 | 9,132 | 7,664 |
| Total United States 1949 | 6,449 | 6,101 | 12,550 | | 80,092 | |
| Total United States 1948 | 7,315 | 7,541 | | 14,856 | | 56,812 |

*Smelters, mines, and manufacturing industries*

The index of manufacturing as released by the Federal Reserve Board dropped sharply from 198 in 1948 to 183 in 1949, however, smelters, mines, and manufacturing plants, troubled by interruptions in the supply of coal, due to strikes and, on the other hand, taking advantage of unusually low prices for residual grades of fuel oil purchased 122,633,000 barrels of these heavy oils in 1949 or 4 percent more than the 1948 quantity of 117,780,000 barrels. Conversely, sales of distillate grades of fuel oil to this group of industries declined by 12 percent from 29,932,000 barrels in 1948 to 26,424,000 in 1949. The Diesel fuel included in the light-oil totals dropped from 12,673,000 barrels in 1948 to 11,367,000 in 1949, a shrinkage of 10 percent, while light fuel oils, other than Diesel grades, declined by 13 percent from 17,259,000 barrels in 1948 to 15,057,000 in 1949. Distillate fuel oils sold to smelters, mines, and manufacturing plants declined from 9 percent of the total domestic requirements for light grades in 1948 to an 8 percent share in 1949, while the sale of residual grades to heavy industries represented a quarter of the domestic market in 1949 compared with 23 percent in 1948.

Sales of distillate fuel oils to smelters, mines, and manufacturing plants showed declines in all areas of the country, except on the Pacific coast, where the demand increased by a third from 1,645,000 barrels in 1948 to 2,173,000 in 1949. About 35 percent of these deliveries are reported from the Middle Atlantic States and there the quantity declined by 10 percent from 10,332,000 barrels in 1948 to 9,306,000 in 1949. The greatest relative loss in demand for light fuel oils by heavy industries was indicated for the North Central States, where the total dropped by 23 percent from 11,190,000 barrels (37 percent of the national demand) in 1948 to 8,668,000 or a third of the country's total in 1949. Less important markets for light oils for use as industrial fuel are the South Central States, South Atlantic States, New England and the Rocky Mountain States, and all of these areas reported a lower demand in 1949 compared with 1948.

The market of heavy grades of industrial fuel increased in all areas in 1949, except on the Pacific coast, where there was a 5-percent decline from 18,137,000 barrels in 1948 to 17,243,000 in 1949. The more important quantities of heavy fuel oils going to industrial plants are reported from the North Central and Middle Atlantic States, where about 30 percent of the national total is credited to each of these areas. The oil companies sold 37,050,000 barrels of heavy fuel oils to manufacturing industries in the Middle Atlantic States in 1949 compared with 36,283,000 in 1948—a 2-percent gain—while there was a similar percent increase for the north central area from 35,146,000 barrels in 1948 to 35,955,000 in 1949. Industrial establishments operating in the New England States made an outstanding gain in their use of heavy fuel oils in 1949, when sales credited to these plants increased by nearly a quarter from 13,709,000 barrels in 1948 to 16,939,000 in 1949. Relatively smaller amounts of heavy industrial fuel oils are sold in other areas, and all deliveries in these markets showed important gains in 1949, except in the South Atlantic States, where the increase in 1949 was only 1 percent over the 1948 total.

TABLE B–25.—*Sales of distillate and residual fuel oils in 1949*

TO SMELTERS, MINES, AND MANUFACTURING INDUSTRIES

[Thousands of barrels of 42 gallons]

| | Distillate fuels | | | | Residual | |
|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Total 1949 | Total 1948 | Total 1949 | Total 1948 |
| California | 1,030 | 165 | 1,195 | 888 | 9,715 | 9,526 |
| Oregon | 396 | 34 | 430 | 314 | 1,948 | 1,929 |
| Washington | 323 | 58 | 381 | 256 | 5,000 | 5,622 |
| Arizona | 96 | 3 | 99 | 88 | 428 | 881 |
| Nevada | 67 | 1 | 68 | 99 | 152 | 179 |
| Idaho | 96 | 12 | 108 | 65 | 186 | 168 |
| Montana | 5 | 3 | 8 | 22 | 58 | 76 |
| Wyoming | 10 | 18 | 28 | 48 | 52 | 62 |
| Utah | 73 | 24 | 97 | 75 | 467 | 332 |
| Colorado | 32 | 43 | 75 | 123 | 329 | 292 |
| New Mexico | 40 | ---- | 40 | 51 | 40 | 37 |
| North Dakota | 11 | 65 | 76 | 55 | 9 | 8 |
| South Dakota | 23 | ---- | 23 | 29 | 98 | 88 |
| Minnesota | 164 | 91 | 255 | 310 | 662 | 616 |
| Nebraska | 51 | 30 | 81 | 90 | 79 | 13 |
| Iowa | 28 | 126 | 154 | 152 | 200 | 151 |
| Wisconsin | 286 | 236 | 522 | 746 | 765 | 429 |
| Illinois | 728 | 802 | 1,530 | 2,070 | 4,914 | 4,826 |
| Indiana | 522 | 689 | 1,211 | 1,464 | 7,519 | 8,022 |
| Michigan | 916 | 1,078 | 1,994 | 2,606 | 7,911 | 7,574 |
| Ohio | 507 | 1,688 | 2,195 | 2,792 | 12,819 | 12,503 |
| Kentucky | 361 | 44 | 405 | 453 | 799 | 746 |
| Tennessee | 102 | 120 | 222 | 423 | 180 | 170 |
| Missouri | 281 | 286 | 567 | 692 | 1,382 | 1,341 |
| Kansas | 297 | 84 | 381 | 305 | 250 | 152 |
| Texas | 551 | 270 | 821 | 889 | 923 | 876 |
| Oklahoma | 38 | 23 | 61 | 71 | 224 | 157 |
| Arkansas | 75 | 139 | 214 | 146 | 183 | 44 |
| Louisiana | 253 | 177 | 430 | 474 | 392 | 140 |
| Mississippi | 49 | 22 | 71 | 98 | 48 | 53 |
| Alabama | 420 | 317 | 737 | 722 | 823 | 785 |
| Maine | 15 | 36 | 51 | 41 | 1,497 | 1,329 |
| New Hampshire | 6 | 43 | 49 | 54 | 516 | 459 |
| Vermont | 28 | 75 | 103 | 117 | 157 | 104 |
| Massachusetts | 47 | 383 | 430 | 367 | 6,648 | 5,750 |
| Rhode Island | 6 | 51 | 57 | 91 | 2,677 | 2,449 |
| Connecticut | 68 | 280 | 348 | 415 | 5,444 | 3,618 |
| New York | 458 | 2,613 | 3,071 | 3,081 | 5,573 | 5,495 |
| New Jersey | 842 | 2,489 | 3,331 | 3,701 | 9,548 | 9,181 |
| Pennsylvania | 778 | 1,869 | 2,647 | 3,220 | 15,947 | 16,531 |
| Delaware | 31 | 41 | 72 | 75 | 1,094 | 806 |
| Maryland | 71 | 105 | 176 | 228 | 4,610 | 4,081 |
| District of Columbia | 4 | 5 | 9 | 27 | 278 | 189 |
| Virginia | 49 | 164 | 213 | 221 | 1,022 | 667 |
| West Virginia | 94 | 25 | 119 | 171 | 1,137 | 1,049 |
| North Carolina | 287 | 98 | 385 | 397 | 216 | 92 |
| South Carolina | 100 | 52 | 152 | 183 | 1,281 | 881 |
| Georgia | 237 | 62 | 299 | 389 | 2,274 | 2,111 |
| Florida | 415 | 18 | 433 | 538 | 4,159 | 5,170 |
| Total United States, 1949 | 11,367 | 15,057 | 26,424 | ---- | 122,633 | ---- |
| Total United States, 1948 | 12,673 | 17,259 | ---- | 29,932 | ---- | 117,780 |

*Heating oils*

The demand for light heating oils (grades 1 to 4) dropped in 1949 for the first time since 1943 and 1944 or when supplies were rationed as a war measure. The decline in sales by 5 percent from 200,024,000 barrels in 1948 to 190,387,000 in 1949 was due largely to a warmer season as measured by degree days, and partly to the lower consumption rate of the newer burners. Conversely there was a small gain in the demand for heavy heating oils (grades 5 and 6) as reported sales were 60,414,000 barrels in 1949 compared with 58,639,000 in 1948. Low prices for residual burning oils in 1949 and interruptions in the coal supply were both factors which increased the demand. Light fuel oils sold for space heating represent about three-fifths of all deliveries while the heavy grades make up about a 12-percent share of the market.

Nearly 60 percent of the light heating oils are sold in the east coast area and there the total declined by 5 percent from 118,445,000 barrels in 1948 to 112,062,000 in 1949. This lower demand in 1949 is in contrast to a gain of 12 percent reported for 1948 over 1947. The decline in demand for distillate heating oils was not so pronounced in the North Central States, where a quarter of the sales are reported, as the quantity dropped by less than 2 percent from 49,151,000 barrels in 1948 to 48,360,000 in 1949. A gain in sales of light heating oils for the Pacific coast area in 1948 was not repeated as 1949 requirements of 20,347,000 barrels were 5 percent below the 1948 total of 21,484,000 barrels. Only relatively small quantities of light grades of heating oils are reported for the South Central and Rocky Mountain States, and there the decline in sales in 1949 were 15 percent and 5 percent, respectively, compared with 1948 totals.

All sections of the country reported larger sales of heavy heating oils in 1949, except the west coast and New England. There was a 20-percent shrinkage in the demand for the California marketing area—6,841,000 barrels in 1949 compared with 8,534,000 in 1948—while requirements in the New England States dropped slightly from 13,853,000 barrels in 1948 to 13,644,000 in 1949. For the east coast as a whole, where about 65 percent of the heavy heating oils are sold, there was a small net gain from 38,134,000 barrels in 1948 to 39,003,000 in 1949. The North Central States are a fairly important market for the residual grades of heating oils and the demand in that area was up above the national average or by 6 percent from 9,296,000 barrels in 1948 to 9,885,000 in 1949. Requirements in the South Central States also increased noticeably from 2,646,000 barrels in 1948 to 4,318,000 in 1949.

TABLE B–26.—*Sales of distillate grades of heating oils in 1949*

[Thousands of barrels of 42 gallons]

| | HEATING OIL | | | | | |
|---|---|---|---|---|---|---|
| | No. 1 | No. 2 | No. 3 | No. 4 | Total 1949 | Total 1948 |
| California | 3,464 | ---------- | 3,261 | ---------- | 6,725 | 7,396 |
| Oregon | 2,150 | ---------- | 2,228 | ---------- | 4,378 | 4,515 |
| Washington | 4,622 | ---------- | 3,539 | ---------- | 8,161 | 8,219 |
| Arizona | 308 | ---------- | 207 | ---------- | 515 | 677 |
| Nevada | 230 | ---------- | 338 | ---------- | 568 | 677 |
| Idaho | 660 | 225 | 72 | 13 | 970 | 1,007 |
| Montana | 290 | 244 | 43 | ---------- | 577 | 541 |
| Wyoming | 49 | 172 | 19 | 1 | 241 | 243 |
| Utah | 201 | 63 | 199 | 50 | 513 | 583 |
| Colorado | 232 | 325 | 90 | 1 | 648 | 719 |
| New Mexico | 35 | 58 | 5 | ---------- | 98 | 128 |
| North Dakota | 290 | 600 | 72 | ---------- | 962 | 553 |
| South Dakota | 324 | 562 | 79 | ---------- | 965 | 805 |
| Minnesota | 1,720 | 4,640 | 1,190 | 31 | 7,581 | 7,212 |
| Nebraska | 902 | 664 | 404 | 5 | 1,975 | 2,236 |
| Iowa | 1,099 | 2,664 | 249 | 1 | 4,013 | 3,496 |
| Wisconsin | 928 | 3,300 | 933 | 26 | 5,187 | 5,123 |
| Illinois | 1,661 | 5,654 | 3,329 | 9 | 10,653 | 12,677 |
| Indiana | 928 | 2,159 | 248 | 32 | 3,367 | 3,748 |
| Michigan | 2,738 | 4,701 | 1,065 | 109 | 8,613 | 7,598 |
| Ohio | 1,887 | 1,191 | 667 | 371 | 4,116 | 4,677 |
| Kentucky | 93 | 288 | 44 | 62 | 487 | 618 |
| Tennessee | 82 | 335 | 24 | ---------- | 441 | 408 |
| Missouri | 740 | 1,787 | 861 | 106 | 3,494 | 4,639 |
| Kansas | 392 | 432 | 34 | 7 | 865 | 951 |
| Texas | 281 | 645 | 35 | 48 | 1,009 | 1,081 |
| Oklahoma | 54 | 129 | 1 | ---------- | 184 | 129 |
| Arkansas | 46 | 64 | 5 | ---------- | 115 | 80 |
| Louisiana | 93 | 182 | 28 | 3 | 306 | 290 |
| Mississippi | 41 | 67 | 4 | ---------- | 112 | 81 |
| Alabama | 145 | 334 | 7 | ---------- | 486 | 463 |
| Maine | 231 | 1,750 | 5 | 2 | 1,988 | 1,840 |
| New Hampshire | 154 | 1,344 | 21 | ---------- | 1,519 | 1,130 |
| Vermont | 77 | 741 | 16 | ---------- | 834 | 661 |
| Massachusetts | 1,201 | 14,535 | 102 | 80 | 15,918 | 17,066 |
| Rhode Island | 106 | 2,754 | 16 | 10 | 2,886 | 3,007 |
| Connecticut | 807 | 6,631 | 103 | 41 | 7,581 | 8,443 |
| New York | 2,271 | 29,982 | 2,251 | 328 | 34,832 | 34,561 |
| New Jersey | 1,497 | 16,057 | 1,570 | 197 | 19,321 | 20,992 |
| Pennsylvania | 1,017 | 10,318 | 513 | 41 | 11,889 | 13,838 |
| Delaware | 133 | 751 | ---------- | ---------- | 884 | 735 |
| Maryland | 474 | 5,562 | 60 | ---------- | 6,096 | 6,981 |
| District of Columbia | 93 | 1,690 | ---------- | 1 | 1,784 | 2,235 |
| Virginia | 442 | 1,802 | 15 | 3 | 2,262 | 2,624 |
| West Virginia | 25 | 144 | 20 | 1 | 190 | 104 |
| North Carolina | 282 | 925 | 464 | ---------- | 1,671 | 1,591 |
| South Carolina | 53 | 460 | 115 | ---------- | 628 | 578 |
| Georgia | 207 | 420 | 91 | ---------- | 718 | 837 |
| Florida | 181 | 737 | 143 | ---------- | 1,061 | 1,222 |
| Total United States 1949 | 35,936 | 128,088 | 24,784 | 1,579 | 190,387 | ---------- |
| Total United States 1948 | 30,630 | 127,637 | 39,986 | 1,771 | ---------- | 200,024 |

TABLE B–27.—*Sales of residual grades of heating oils in 1949*

[Thousands of barrels of 42 gallons]

| | HEAVY HEATING OILS | | | |
|---|---|---|---|---|
| | No. 5 | No. 6 | Total 1949 | Total 1948 |
| California | 2,791 | 488 | 3,279 | 4,369 |
| Oregon | 1,032 | 74 | 1,106 | 1,545 |
| Washington | 2,025 | 328 | 2,353 | 2,532 |
| Arizona | 23 | 3 | 26 | 23 |
| Nevada | 65 | 12 | 77 | 65 |
| Idaho | 69 | 13 | 82 | 5 |
| Montana | 30 | 65 | 95 | 13 |
| Wyoming | 13 | 9 | 22 | 10 |
| Utah | 28 | 29 | 57 | ---- |
| Colorado | 33 | 76 | 109 | 1 |
| New Mexico | 1 | 1 | 2 | ---- |
| North Dakota | 4 | ---- | 4 | 12 |
| South Dakota | 11 | 9 | 20 | 25 |
| Minnesota | 329 | 140 | 469 | 297 |
| Nebraska | 127 | 70 | 197 | 86 |
| Iowa | 201 | 54 | 255 | 91 |
| Wisconsin | 305 | 245 | 550 | 785 |
| Illinois | 2,751 | 2,083 | 4,834 | 4,898 |
| Indiana | 355 | 430 | 785 | 597 |
| Michigan | 815 | 1,081 | 1,896 | 2,059 |
| Ohio | 329 | 233 | 562 | 246 |
| Kentucky | 25 | 111 | 136 | 69 |
| Tennessee | 12 | 165 | 177 | 131 |
| Missouri | 974 | 507 | 1,481 | 2,132 |
| Kansas | 376 | 152 | 528 | 159 |
| Texas | 834 | 470 | 1,304 | 211 |
| Oklahoma | 126 | 60 | 186 | 18 |
| Arkansas | 110 | 148 | 258 | 5 |
| Louisiana | 242 | 260 | 502 | 84 |
| Mississippi | 1 | 4 | 5 | 2 |
| Alabama | 12 | 42 | 54 | 35 |
| Maine | 76 | 187 | 263 | 137 |
| New Hampshire | 21 | 180 | 201 | 97 |
| Vermont | 8 | 43 | 51 | 70 |
| Massachusetts | 1,388 | 5,720 | 7,108 | 8,071 |
| Rhode Island | 224 | 1,547 | 1,771 | 1,510 |
| Connecticut | 1,910 | 2,340 | 4,250 | 3,968 |
| New York | 2,411 | 9,510 | 11,921 | 12,265 |
| New Jersey | 2,118 | 4,802 | 6,920 | 5,865 |
| Pennsylvania | 1,412 | 1,964 | 3,376 | 4,174 |
| Delaware | 82 | 136 | 218 | 80 |
| Maryland | 181 | 681 | 862 | 753 |
| District of Columbia | 96 | 649 | 745 | 575 |
| Virginia | 43 | 165 | 208 | 173 |
| West Virginia | 75 | 35 | 110 | 2 |
| North Carolina | 21 | 17 | 38 | ---- |
| South Carolina | 18 | 2 | 20 | 7 |
| Georgia | 205 | 289 | 494 | 48 |
| Florida | 172 | 275 | 447 | 339 |
| Total United States, 1949 | 24,510 | 35,904 | 60,414 | ---- |
| Total United States, 1948 | 24,418 | 34,221 | ---- | 58,639 |

*Range oil*

Some No. 1 fuel oil, as well as kerosene, is sold for range-burner fuel. The fuel oil reported as delivered for this particular use declined by 9 percent from 13,534,000 barrels in 1948 to 12,279,000 in 1949, while the kerosene portion was lower by 6 percent from 70,629,000 barrels in 1948 to 66,244,000 in 1949. The range-oil total, including both No. 1 fuel oil and kerosene, dropped from 84,163,000 barrels in 1948 to 78,523,000 in 1949. Incidentally this is the first decline in range oil-sales since 1943, when a moderate loss was recorded. In recent years the kerosene included in range-oil sales has varied from 84 to 86 percent of the total and the No. 1 fuel oil has supplied the balance.

About a third of the range-oil sales are made in the New England States and there requirements declined by 13 percent from 28,606,000 barrels in 1948 to 25,040,000 in 1949. Consumers in the Middle Atlantic area also buy large quantities of range oil—a quarter of the total; however, deliveries in 1949 of 18,886,000 barrels were 12 percent below the 1948 total of 21,472,000 barrels. The North Central States are a third important market for range oil and the demand there of 17,498,000 barrels in 1949 differed very little from 1948 requirements of 17,766,000 barrels. The South Central and South Atlantic States have reported greatly increased sales of range oil in recent years. Deliveries of 3,525,000 barrels for the South Central States in 1945 have doubled to 7,055,000 in 1948 and 7,193,000 barrels in 1949, while there has been a similar growth in the South Atlantic area from 3,037,000 barrels in 1945 to 7,492,000 in 1948 and 8,856,000 barrels in 1949. Incidentally these were the only two regions to show gains in range-oil requirements in 1949.

*United States Army, Navy, Air Force, and Coast Guard*

Military requirements for fuel oils, which showed some expansion in 1948 after a steady postwar decline, turned downward again in 1949. Deliveries of light fuel oils, including Diesel fuel, to the various services of 6,109,000 barrels in 1949 were a third less than a revised total of 9,071,000 barrels reported for 1948. Diesel fuel in these items totaled 6,832,000 barrels in 1948 and 4,490,000 in 1949. The loss in volume for the heavy grades in 1949, was less pronounced—8 percent—or from a revised item of 24,655,000 barrels in 1948 to 22,724,000 in 1949. The military demand for light fuel oils represented 3 percent of all deliveries in 1948 and 2 percent in 1949, while heavy fuel oils credited to the armed services remained at about 5 percent of the total sales for both years.

It has been noted that the annual fuel oil sales to the military services as reported by distributors do not include quantities imported under item 16, entered free for the United States Government, appearing in the Bureau of the Census import statistics. Any fuel oil products included in this classification are usually handled by the military forces and consequently the oil companies would have no record of such receipts. Any fuel oils entering the country under item 16 are however included in the "imports" and are therefore accounted for in the available supply when calculating the indicated domestic demand. Fuel oils imported under this item in 1948 were 1,834,000 barrels of light fuel oils and 4,446,000 of heavy grades. Comparative totals for 1949 were 539,000 barrels of distillate grades and 4,014,000 barrels of residual fuel oils.

About 40 percent of the diesel fuel sold to the Armed Forces is reported from the California marketing area, and there the demand declined by 42 percent from 3,125,000 barrels in 1948 to 1,816,000 in 1949. Deliveries of diesel grades in the Atlantic Coast States were lower by 9 percent—1,841,000 barrels in 1949 compared with 2,028,000 in 1948; however, the share of the national total for the region increased from 30 percent in 1948 to 41 percent in 1949. Military requirements for diesel fuel in the South Central States were down sharply from 1,608,000 barrels in 1948 to 647,000 in 1949—a 60-percent drop. The Rocky Mountain and north central areas report very little Diesel oil as sold to armed services; however, quantities in 1949 were well above 1948 requirements.

Sales of heavy fuel oils to the military branches of the Government were lower in all parts of the country except in the South Atlantic States where the demand rose by a half from 4,177,000 barrels in 1948 to 6,205,000 in 1949. Over 50 percent of the demand for residual grades is reported from the Pacific coast area, and sales there declined by 14 percent from 13,289,000 barrels in 1948 to 11,494,000 in 1949. Deliveries of heavy fuel oil to the Armed Forces in the Middle Atlantic States were 1,542,000 barrels in 1949 compared to 3,521,000 in 1948, or more than a 50-percent loss, while the shrinkage in requirements for the New England area was less pronounced—1,463,000 barrels in 1949 compared with 1,544,000 in 1948. There was little change in the volume of heavy fuel oils delivered to the military services in the South Central States—1,901,000 barrels in 1949 against 1,928,000 in 1948.

TABLE B–28.—*Sales of distillate and residual fuel oils in 1949*

[Thousands of barrels of 42 gallons]

TO MILITARY (U. S. ARMY, NAVY, AIR FORCE, AND COAST GUARD)

| | Distillate fuels | | | | Residual | | | |
|---|---|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Total 1949 | Total 1948 [1] | Navy grade | Other residual | Total 1949 | Total 1948 [1] |
| California | 1,737 | 582 | 2,319 | 3,513 | 10,946 | 402 | 11,348 | 13,015 |
| Oregon | 34 | 6 | 40 | 53 | | 70 | 70 | 73 |
| Washington | 44 | 28 | 72 | 93 | | 76 | 76 | 157 |
| Arizona | | 2 | 2 | 8 | | | | |
| Nevada | 1 | 2 | 3 | 15 | | | | 44 |
| Idaho | 2 | 5 | 7 | 3 | | 1 | 1 | |
| Montana | | | | | | 2 | 2 | |
| Wyoming | | | | | | 2 | 2 | |
| Utah | 10 | | 10 | 38 | | | | 1 |
| Colorado | 2 | 3 | 5 | | | 1 | 1 | |
| New Mexico | 32 | 45 | 77 | 2 | | 2 | 2 | 3 |
| North Dakota | | 36 | 36 | 3 | | | | 1 |
| South Dakota | | | | 1 | | 3 | 3 | |
| Minnesota | 1 | | 1 | | | | | |
| Nebraska | 2 | 11 | 13 | 17 | 2 | 1 | 3 | |
| Iowa | | | | | | | | 2 |
| Wisconsin | 2 | 3 | 5 | 2 | | 1 | 1 | |
| Illinois | 5 | 15 | 20 | 29 | | 16 | 16 | 130 |
| Indiana | 8 | 21 | 29 | 1 | | 3 | 3 | |
| Michigan | 18 | 111 | 129 | 17 | 1 | 16 | 17 | 13 |
| Ohio | 50 | 14 | 64 | 39 | | 66 | 66 | 46 |
| Kentucky | 43 | 4 | 47 | | | | | |
| Tennessee | 11 | 2 | 13 | 1 | 2 | | 2 | |
| Missouri | 7 | 7 | 14 | 1 | | 42 | 42 | 66 |
| Kansas | | | | 1 | | 3 | 3 | |
| Texas | 544 | 69 | 613 | 1,768 | 123 | 1,096 | 1,219 | 1,167 |
| Oklahoma | 1 | 55 | 56 | 5 | | | | |
| Arkansas | 1 | | 1 | | | 4 | 4 | |
| Louisiana | 70 | 6 | 76 | 159 | 342 | 267 | 609 | 633 |
| Mississippi | 8 | | 8 | | | | | 8 |
| Alabama | 16 | | 16 | 25 | | 24 | 24 | 54 |
| Maine | 14 | 3 | 17 | 213 | | 1 | 1 | 5 |
| New Hampshire | 115 | 2 | 117 | 59 | | | | |
| Vermont | 2 | 2 | 4 | 1 | | | | |
| Massachusetts | 189 | 38 | 227 | 384 | | 142 | 142 | 174 |
| Rhode Island | 63 | 54 | 117 | 26 | 600 | 620 | 1,220 | 1,226 |
| Connecticut | 107 | 20 | 127 | 113 | 92 | 8 | 100 | 139 |
| New York | 99 | 12 | 111 | 667 | 289 | 367 | 656 | 1,028 |
| New Jersey | 6 | 51 | 57 | 97 | | 76 | 76 | 822 |
| Pennsylvania | 396 | 28 | 424 | 459 | | 424 | 424 | 1,095 |
| Delaware | 1 | 2 | 3 | 2 | | | | |
| Maryland | 30 | 12 | 42 | 92 | 123 | 263 | 386 | 576 |
| District of Columbia | 1 | 10 | 11 | 66 | | | | |
| Virginia | 620 | 168 | 788 | 675 | 201 | 5,302 | 5,503 | 3,291 |
| West Virginia | 4 | 1 | 5 | 2 | | | | |
| North Carolina | 27 | 34 | 61 | 41 | | 43 | 43 | 54 |
| South Carolina | 48 | 4 | 52 | 68 | | 93 | 93 | 160 |
| Georgia | 15 | 1 | 16 | 11 | | 163 | 163 | 187 |
| Florida | 104 | 150 | 254 | 301 | 305 | 98 | 403 | 485 |
| Total United States 1949 | 4,490 | 1,619 | 6,109 | | 13,026 | 9,698 | 22,724 | |
| Total United States 1948 [1] | 6,832 | 2,239 | | 9,071 | 13,557 | 11,098 | | 24,655 |

[1] Revised.

*Oil company fuel*

The petroleum industry in its producing, refining, and transportation activities used 55,647,000 barrels of heavy fuel oil, including crude petroleum in 1949, a quantity only slightly below 1948 requirements of 56,637,000 barrels. Crude production was lower by 9 percent in 1949 compared with 1948 and crude runs at refineries were down by 4 percent; however, the heavy oil consumed for fuel purposes did not decline proportionately, as the 1948 total was below average because of a pinch for supplies in some areas during that year. The oil companies use relatively small amounts of light fuel oil, including Diesel grades; however, requirements expanded by 14 percent from 3,625,000 barrels in 1948 to 4,151,000 in 1949. The heavy fuel oil consumed by the petroleum industry represents about 11 percent of the national total, while the light grades constitute about 1 percent.

The oil companies operating in the California, north central, and south Atlantic areas used more heavy fuel oils in their various activities in 1949 than in 1948, while requirements in all other areas declined. The quantity for the Pacific coast rose from 4,770,000 barrels in 1948 to 8,933,000 in 1949, even though crude production and refinery runs were lower in the latter year in that area. The greater use of fuel oil was partly the result of making more gasoline in 1949, which takes more B. t. u.'s per barrel for its refining and the fact that less natural gas was used as refinery fuel. Oil companies operating in the North Central States reported the consumption of 15,407,000 barrels of residual fuel oils in 1949 compared with 12,498,000 in 1948. Quantities used by oil companies in the South Atlantic States are of minor importance in volume; however, there was a gain in 1949 over 1948.

The lower consumption of heavy fuel oils by the petroleum industry operating in the South Central States—11,148,000 barrels in 1949 compared with 18,178,000 in 1948—and the Middle Atlantic States—16,540,000 barrels in 1949 against 17,394,000 in 1948—is the result of a smaller production of crude petroleum and lower refinery runs in 1949. Oil companies operating in the New England and Rocky Mountain States use only relatively small amounts of heavy fuel oil in their various operations and the quantities declined in 1949 compared with 1948.

Oil companies use some crude petroleum for fuel in their field and pipeline operations. The quantity reported in the survey declined by a third from 2,916,000 barrels in 1948 to 1,998,000 in 1949. Most of this crude petroleum consumed by the oil companies is reported from the South Central States, where the total declined from 1,935,000 barrels in 1948 to 1,180,000 in 1949, and the west coast area, where requirements were 613,000 barrels in 1948 and 539,000 in 1949.

TABLE B–29.—*Consumption of distillate and residual fuels in 1949*

[Thousands of barrels of 42 gallons]

FOR OIL COMPANY FUEL

| | Distillate fuels | | | | Residual fuels | | | |
|---|---|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Total 1949 | Total 1948 | Residual fuel | Crude oil | Total 1949 | Total 1948 |
| California | 141 | 31 | 172 | 204 | 7,947 | 539 | 8,486 | 4,354 |
| Oregon | 6 | ------ | 6 | 3 | 211 | ------ | 211 | 180 |
| Washington | 19 | ------ | 19 | 19 | 236 | ------ | 236 | 236 |
| Arizona | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Nevada | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Idaho | ------ | ------ | ------ | ------ | 63 | ------ | 63 | ------ |
| Montana | 1 | 1 | 2 | 1 | 186 | 22 | 208 | 201 |
| Wyoming | 9 | 242 | 251 | 329 | 912 | 13 | 925 | 1,094 |
| Utah | 2 | ------ | 2 | 1 | 969 | ------ | 969 | 904 |
| Colorado | ------ | 2 | 2 | 3 | 38 | ------ | 38 | 68 |
| New Mexico | 1 | ------ | 1 | 2 | 11 | 6 | 17 | 60 |
| North Dakota | ------ | ------ | ------ | ------ | 1 | ------ | 1 | ------ |
| South Dakota | ------ | ------ | ------ | 1 | ------ | ------ | ------ | ------ |
| Minnesota | ------ | 10 | 10 | 7 | 4 | ------ | 4 | 6 |
| Nebraska | ------ | 4 | 4 | 3 | ------ | 1 | 1 | 31 |
| Iowa | 1 | 4 | 5 | 3 | ------ | ------ | ------ | ------ |
| Wisconsin | 1 | 16 | 17 | 11 | ------ | 1 | 1 | ------ |
| Illinois | 4 | 48 | 52 | 45 | 3,905 | 83 | 3,988 | 4,061 |
| Indiana | 5 | 828 | 833 | 685 | 8,672 | 65 | 8,737 | 4,626 |
| Michigan | 2 | 33 | 35 | 9 | 463 | 1 | 464 | 631 |
| Ohio | 3 | 57 | 60 | 52 | 2,094 | 10 | 2,104 | 2,315 |
| Kentucky | 3 | 2 | 5 | 3 | 39 | 62 | 101 | 320 |
| Tennessee | 3 | 1 | 4 | 3 | 6 | ------ | 6 | 8 |
| Missouri | 11 | 7 | 18 | 4 | 416 | 170 | 586 | 629 |
| Kansas | 19 | 22 | 41 | 325 | 1,540 | 52 | 1,592 | 1,751 |
| Texas | 78 | 900 | 978 | 597 | 5,467 | 641 | 6,108 | 12,284 |
| Oklahoma | 28 | 116 | 144 | 71 | 2,175 | 142 | 2,317 | 2,198 |
| Arkansas | 2 | ------ | 2 | 1 | 1 | 1 | 2 | 8 |
| Louisiana | 50 | 1 | 51 | 42 | 361 | 132 | 493 | 1,209 |
| Mississippi | 5 | ------ | 5 | 8 | 3 | 42 | 45 | 93 |
| Alabama | 4 | 1 | 5 | 3 | 5 | ------ | 5 | 6 |
| Maine | 2 | 6 | 8 | 5 | 27 | ------ | 27 | 30 |
| New Hampshire | ------ | 4 | 4 | 2 | ------ | ------ | ------ | ------ |
| Vermont | ------ | 4 | 4 | 3 | ------ | 1 | 1 | ------ |
| Massachusetts | 2 | 90 | 92 | 21 | 586 | ------ | 586 | 636 |
| Rhode Island | ------ | 8 | 8 | 5 | 386 | ------ | 386 | 419 |
| Connecticut | 1 | 13 | 14 | 10 | 56 | ------ | 56 | 54 |
| New York | 2 | 264 | 266 | 257 | 1,648 | 3 | 1,651 | 2,027 |
| New Jersey | 3 | 123 | 126 | 220 | 7,029 | 1 | 7,030 | 6,236 |
| Pennsylvania | 1 | 833 | 834 | 613 | 7,051 | 7 | 7,058 | 8,429 |
| Delaware | ------ | 2 | 2 | ------ | 106 | ------ | 106 | 113 |
| Maryland | 1 | 10 | 11 | 5 | 688 | ------ | 688 | 581 |
| District of Columbia | ------ | 5 | 5 | 6 | 7 | ------ | 7 | 8 |
| Virginia | 18 | 7 | 25 | 7 | 72 | 1 | 73 | 72 |
| West Virginia | ------ | 3 | 3 | ------ | 9 | 2 | 11 | 82 |
| North Carolina | 2 | 6 | 8 | 29 | 4 | ------ | 4 | 3 |
| South Carolina | 3 | 4 | 7 | 1 | 93 | ------ | 93 | 14 |
| Georgia | 2 | ------ | 2 | 2 | 121 | ------ | 121 | 122 |
| Florida | 6 | 2 | 8 | 4 | 41 | ------ | 41 | 38 |
| Total United States 1949 | 441 | 3,710 | 4,151 | ------ | 53,649 | 1,998 | 55,647 | ------ |
| Total United States 1948 | 410 | 3,215 | ------ | 3,625 | 53,721 | 2,916 | ------ | 56,637 |

*Miscellaneous uses*

About 8 percent of the light fuel oils and about 1 percent of the heavy grades are reported as sold for various purposes not included under the other principal uses. The diesel oils included are delivered to fuel heavy equipment on and off the highways. Other fuel oils under this miscellaneous classification are used for orchard heating, spraying, and as components going into the manufacture of other products, and so forth. The total for distillate fuel oils reported for miscellaneous uses of 25,571,000 barrels in 1949 differed only slightly from the 1948 item of 25,414,000 while the residuals declined from 6,623,000 barrels in 1948 to 4,574,000 in 1949. Most of the light oils sold for the above purposes are Diesel grades and the demand for this fuel increased from 15,971,000 barrels in 1948 to 16,734,000 in 1949. Distillate fuel oils reported as tractor fuel declined from 4,191,000

barrels in 1948 to 3,810,000 in 1949. This lower demand for distillate fuel oil for use as tractor fuel, which is likewise noted for kerosene, reflects the greater use of gasoline by the modern tractor. Most of the light oils used for tractor fuel are reported from the North Central States—1,962,000 barrels in 1948 and 1,483,000 in 1949—and the South Central States—1,315,000 barrels in 1948 and 1,483,000 in 1949.

TABLE B–30.—*Sales of distillate and residual fuels in 1949*

[Thousands of barrels of 42 gallons]

MISCELLANEOUS USES (TRUCKS, DREDGES, ROAD OILS, SPRAYS, ETC.)

| | Distillate fuels | | | | | Residual fuel | |
|---|---|---|---|---|---|---|---|
| | Diesel fuel | Other light | Tractor fuel | Total 1949 | Total 1948 | Total 1949 | Total 1948 |
| California | 5,126 | 635 | ---------- | 5,761 | 5,429 | 1,764 | 1,690 |
| Oregon | 868 | 173 | ---------- | 1,041 | 940 | 101 | 79 |
| Washington | 1,202 | 241 | ---------- | 1,443 | 1,283 | 151 | 89 |
| Arizona | 309 | 17 | ---------- | 326 | 473 | ---------- | 104 |
| Nevada | 143 | 35 | ---------- | 178 | 174 | 13 | 10 |
| Idaho | 246 | 18 | 7 | 271 | 320 | 5 | 7 |
| Montana | 331 | 20 | 47 | 398 | 412 | 37 | 4 |
| Wyoming | 140 | 11 | 65 | 216 | 246 | 6 | 14 |
| Utah | 212 | 6 | 6 | 224 | 262 | 3 | 7 |
| Colorado | 103 | 4 | 27 | 134 | 266 | 7 | 23 |
| New Mexico | 111 | ---------- | 1 | 112 | 105 | ---------- | 30 |
| North Dakota | 66 | 9 | 22 | 97 | 147 | 19 | 8 |
| South Dakota | 21 | 11 | 27 | 59 | 94 | 13 | 32 |
| Minnesota | 60 | 6 | 34 | 100 | 528 | ---------- | 111 |
| Nebraska | 110 | 11 | 129 | 250 | 378 | ---------- | 10 |
| Iowa | 47 | 19 | 407 | 473 | 883 | 5 | 42 |
| Wisconsin | 139 | 210 | 42 | 391 | 548 | 11 | 113 |
| Illinois | 459 | 524 | 109 | 1,092 | 1,073 | 109 | 408 |
| Indiana | 308 | 320 | 410 | 1,038 | 1,028 | 38 | 35 |
| Michigan | 297 | 668 | 103 | 1,068 | 736 | 129 | 49 |
| Ohio | 387 | 226 | 36 | 649 | 597 | 183 | 91 |
| Kentucky | 418 | 35 | 64 | 517 | 370 | 22 | 63 |
| Tennessee | 154 | 62 | 100 | 316 | 354 | 13 | 75 |
| Missouri | 162 | 22 | 261 | 445 | 587 | 47 | 164 |
| Kansas | 124 | 10 | 160 | 294 | 516 | 9 | 55 |
| Texas | 1,120 | 128 | 49 | 1,297 | 895 | 305 | 383 |
| Oklahoma | 247 | 3 | 1 | 251 | 247 | 6 | 149 |
| Arkansas | 243 | 53 | 501 | 797 | 662 | 4 | 21 |
| Louisiana | 602 | 3 | 230 | 835 | 825 | 114 | 338 |
| Mississippi | 322 | 24 | 137 | 483 | 495 | 13 | 3 |
| Alabama | 139 | 25 | 144 | 308 | 473 | 52 | 31 |
| Maine | 20 | 17 | 2 | 39 | 29 | 39 | 12 |
| New Hampshire | 12 | 1 | ---------- | 13 | 25 | 1 | 1 |
| Vermont | 6 | 1 | 1 | 8 | 15 | 1 | ---------- |
| Massachusetts | 48 | 33 | ---------- | 81 | 64 | 23 | 24 |
| Rhode Island | 5 | 2 | ---------- | 7 | 21 | 31 | 28 |
| Connecticut | 11 | 2 | 3 | 16 | 29 | 163 | 82 |
| New York | 470 | 509 | 28 | 1,007 | 567 | 47 | 262 |
| New Jersey | 432 | 111 | 1 | 544 | 547 | 14 | 80 |
| Pennsylvania | 269 | 253 | 96 | 618 | 537 | 41 | 15 |
| Delaware | 18 | 10 | ---------- | 28 | 22 | 1 | 3 |
| Maryland | 201 | 38 | 3 | 242 | 266 | 476 | 498 |
| District of Columbia | 31 | 17 | 27 | 75 | 52 | 31 | 36 |
| Virginia | 120 | 320 | 41 | 481 | 375 | 80 | 83 |
| West Virginia | 165 | 39 | 1 | 205 | 264 | 3 | 6 |
| North Carolina | 51 | 39 | 37 | 127 | 152 | 137 | 217 |
| South Carolina | 124 | 10 | 90 | 224 | 181 | 52 | 45 |
| Georgia | 178 | 51 | 231 | 460 | 490 | 96 | 42 |
| Florida | 357 | 45 | 130 | 532 | 432 | 159 | 951 |
| Total United States 1949 | 16,734 | 5,027 | 3,810 | 25,571 | ---------- | 4,574 | ---------- |
| Total United States 1948 | 15,971 | 5,252 | 4,191 | ---------- | 25,414 | ---------- | 6,623 |

*Diesel fuel*

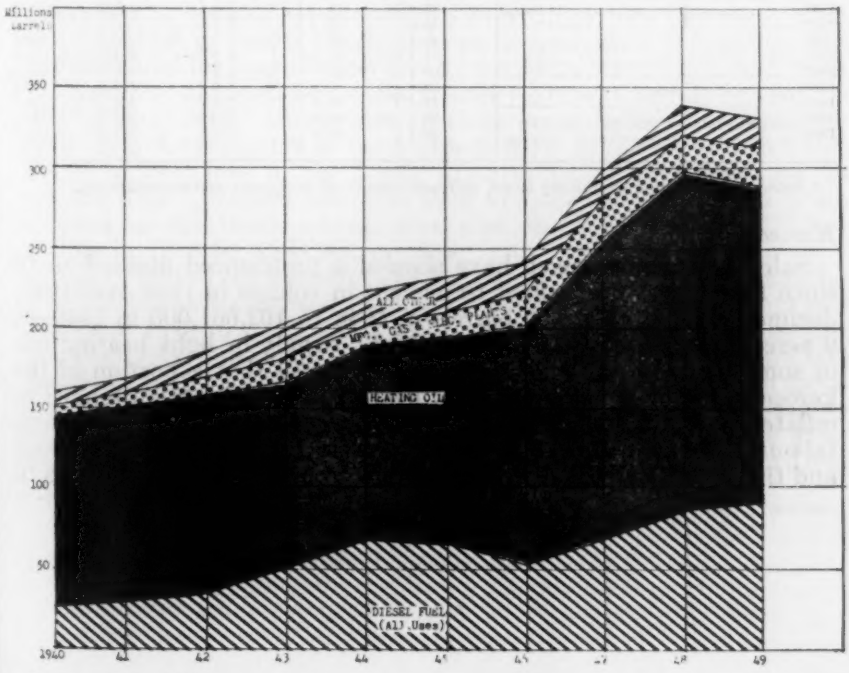
Large purchases of diesel fuel by the railroads in 1949 were sufficient to offset lower demand in several of the other classifications, so that the sales reported for the year of 87,919,000 barrels were 3 percent above a revised total of 85,505,000 for 1948. The small gain in 1949 compares with a 22 percent increment in 1948 over the 1947 market.

Sales of diesel fuel for civilian uses increased from 78,673,000 barrels in 1948 to 83,429,000 in 1949—a gain of 6 percent—while requirements for military purposes declined by a third from a revised total of 6,832,000 barrels in 1948 to 4,490,000 in 1949.

Diesel fuel reported as sold to the railroads increased by 26 percent in 1949 and represented 41 percent of the total compared to a third of the market in 1948. Approximately a fifth of the diesel oil total is delivered for fuel use in heavy equipment operating on and off the highways and is entered under miscellaneous uses which increased by 5 percent in 1949 over 1948. Oil companies use very little diesel fuel; however, the quantity increased slightly in 1949. Diesel oil credited to vessels declined by 10 percent in 1949 compared with 1948 requirements and the relative share for the item declined from 16 percent of all sales in 1948 to 14 percent in 1949. Smelters, mines, and manufacturing industries bought 10 percent less diesel fuel in 1949 than in 1948 and the share for this use declined from 15 percent of the national total to 13 percent in 1949. Gas and electric power utilities were credited with 9 percent of the diesel fuel total in 1948 and 7 percent in 1949, while their purchases were lower by 12 percent.

The fast-growing demand for diesel fuel, the sales of which have more than tripled in volume in the past 10 years, and the effect of this rapidly growing competitive market on light heating oils is shown in tables 5 to 7 and is also graphically presented in figure B–10. In this period light fuel oils sold for diesel fuel have expanded from a 15-percent proportion of all distillate fuel-oil sales to a 27-percent share in 1949, while quantities credited to light grades of heating oils have

FIGURE B–10.—PRINCIPAL USES OF DISTILLATE FUEL OIL, 1941–49.




Source: Bureau of Mines.

dropped proportionately or from about three-quarters of all distillate oil requirements in 1940 to 62 percent of the total in 1949. The review figures in the tables and the graph indicate only slight variations in the relative proportions of light fuel oils reported for the other principal uses.

TABLE B–31.—*Principal uses of distillate fuel oil*

| Year | Diesel fuel, all uses | Heating oils including No. 1 range oil | Manufacturing and public utilities | All other light oils [1] | Total |
|---|---|---|---|---|---|
| 1940 | 24,609 | 119,510 | 8,303 | 8,170 | 160,652 |
| 1941 | 27,351 | 125,357 | 10,497 | 10,134 | 173,339 |
| 1942 | 33,653 | 126,484 | 12,188 | 14,488 | 186,813 |
| 1943 | 49,127 | 118,457 | 13,960 | 26,168 | 207,712 |
| 1944 | 70,230 | 118,348 | 14,726 | 20,568 | 223,872 |
| 1945 | 66,412 | 128,823 | 16,803 | 19,587 | 231,625 |
| 1946 | 54,063 | 148,096 | 20,684 | 16,707 | 239,550 |
| 1947 | 69,857 | 189,991 | 21,633 | 16,533 | 298,014 |
| 1948 | 85,505 | 213,558 | 24,800 | 18,110 | 341,973 |
| 1949 | 87,919 | 202,666 | 21,158 | 17,453 | 329,196 |

[1] Includes light oil used by military forces, railroads, vessels, oil companies, and miscellaneous.

TABLE B–32.—*Percentage uses of distillate fuel oil*

| Year | Diesel fuel, all uses | Heating oils including No. 1 range oil | Manufacturing and public utilities | All other light oils [1] | Total |
|---|---|---|---|---|---|
| 1940 | 15.3 | 74.4 | 5.2 | 5.1 | 100.0 |
| 1941 | 15.8 | 72.3 | 6.1 | 5.8 | 100.0 |
| 1942 | 18.0 | 67.8 | 6.5 | 7.7 | 100.0 |
| 1943 | 23.7 | 57.0 | 6.7 | 12.6 | 100.0 |
| 1944 | 31.4 | 52.8 | 6.6 | 9.2 | 100.0 |
| 1945 | 28.7 | 55.6 | 7.2 | 8.5 | 100.0 |
| 1946 | 22.6 | 61.8 | 8.6 | 7.0 | 100.0 |
| 1947 | 23.4 | 63.8 | 7.3 | 5.5 | 100.0 |
| 1948 | 25.0 | 62.4 | 7.3 | 5.3 | 100.0 |
| 1949 | 26.7 | 61.6 | 6.4 | 5.3 | 100.0 |

[1] Includes light oil used by military forces, railroads, vessels, oil companies, and miscellaneous.

### *Kerosene*

Sales of kerosene which have showed a pronounced upward trend since 1943 and which gained 10 percent in volume in 1948 over 1947, declined from 112,487,000 barrels in 1948 to 102,661,000 in 1949—a 9 percent shrinkage. There was a tight supply in light heating oils in some areas in early 1948 and it is believed that a portion of the kerosene was delivered for central heating, which diversion tended to inflate the total for that year. The major share of the kerosene (about 63 percent in 1948 and 65 percent in 1949) is sold for range oil and this use declined by 6 percent from 70,629,000 barrels in 1948 to

66,244,000 in 1949. Kerosene reported as tractor fuel has dropped in quantity in recent years as the newer gasoline-burning tractors have increased in numbers. Sales of kerosene for tractor fuel have declined from a peak of 8,209,000 barrels in 1947 to 6,176,000 in 1948 and to 4,840,000 in 1949. Kerosene sold for various miscellaneous uses has varied from 32,012,000 barrels in 1947 to 35,682,000 barrels in 1948 and then down to 31,577,000 in 1949—a shrinkage of 12 percent for the latter year.

TABLE B–33.—*Sales of kerosene and range oil, 1945–49*

| Uses | 1945 | 1946 | 1947 | 1948 | 1949 | Percent change in 1949 to 1948 |
|---|---|---|---|---|---|---|
| Kerosene sold as range oil | 43,540 | 52,105 | 62,482 | 70,692 | 66,244 | −6.2 |
| Tractor fuel | 6,747 | 7,544 | 8,209 | 6,176 | 4,840 | −21.6 |
| All other uses | 24,689 | 28,441 | 32,012 | 35,682 | 31,577 | −11.5 |
| Total United States | 74,976 | 88,090 | 102,703 | 112,487 | 102,661 | −8.7 |
| Exports and shipments | 6,180 | 8,637 | 7,252 | 3,495 | 2,532 | −27.6 |
| Grand total kerosene | 81,156 | 96,727 | 109,955 | 115,982 | 105,193 | −9.3 |
| Kerosene sold as range oil | 43,540 | 52,105 | 62,482 | 70,629 | 66,244 | −6.2 |
| No. 1 fuel oil sold as range oil | 7,481 | 8,459 | 11,632 | 13,534 | 12,279 | −9.3 |
| Total fuel sold as range oil | 51,021 | 60,564 | 74,114 | 84,163 | 78,523 | −6.7 |

More than a third of the kerosene sold for range oil is reported from the New England States, and the demand in that market declined by 12 percent from 26,931,000 barrels in 1948 to 23,740,000 in 1949. There was a similar percentage drop in kerosene range oil requirements in the Middle Atlantic States from 20,242,000 barrels in 1948 to 17,819,000 in 1949. Fairly important quantities of kerosene are also delivered for range burner fuel in the north central area and there the quantity changed but slightly from 9,612,000 barrels in 1948 to 9,598,000 in 1949. In contrast to these losses, sales of kerosene for range fuel showed gains in the southern parts of the country in 1949. Reported deliveries in the South Atlantic States were larger by 20 percent from 7,060,000 barrels in 1948 to 8,477,000 in 1949, while the demand in the south central area was up slightly from 5,677,000 barrels in 1948 to 5,864,000 in 1949.

Nearly half of the kerosene sold for tractor fuel is reported from the North Central States, and the market there declined from 3,017,000 barrels in 1948 to 2,223,000 in 1949. The South Central States also use relatively important quantities, and there sales were 1,688,000 barrels in 1948 and 1,392,000 in 1949. Still smaller amounts of kerosene tractor fuel are credited to the South Atlantic States—814,000 barrels in 1948 and 648,000 in 1949—and the Middle Atlantic area, where the demand dropped from 468,000 barrels in 1948 to 270,000 in 1949.

TABLE B–34.—*Sales of distillate fuel oils in 1948 and 1949*

[Thousands of barrels of 42 gallons]

TOTAL DISTILLATE FUEL OIL

| | Diesel fuel | | Other light [1] | | Total | |
|---|---|---|---|---|---|---|
| | 1949 | 1948 [2] | 1949 | 1948 [2] | 1949 | 1948 [2] |
| California | 13,075 | 13,896 | 8,157 | 8,677 | 21,232 | 22,573 |
| Oregon | 1,751 | 1,480 | 4,592 | 4,701 | 6,343 | 6,181 |
| Washington | 2,726 | 2,499 | 8,489 | 8,506 | 11,215 | 11,005 |
| Arizona | 469 | 601 | 552 | 741 | 1,021 | 1,342 |
| Nevada | 1,166 | 642 | 606 | 721 | 1,772 | 1,363 |
| Idaho | 495 | 420 | 1,067 | 1,150 | 1,562 | 1,570 |
| Montana | 1,187 | 821 | 778 | 989 | 1,965 | 1,810 |
| Wyoming | 896 | 852 | 608 | 748 | 1,504 | 1,600 |
| Utah | 884 | 676 | 590 | 772 | 1,474 | 1,448 |
| Colorado | 824 | 785 | 859 | 1,191 | 1,683 | 1,976 |
| New Mexico | 533 | 412 | 182 | 241 | 715 | 653 |
| North Dakota | 398 | 375 | 1,218 | 937 | 1,616 | 1,312 |
| South Dakota | 389 | 367 | 1,121 | 1,067 | 1,510 | 1,434 |
| Minnesota | 1,306 | 1,147 | 8,788 | 9,082 | 10,094 | 10,229 |
| Nebraska | 1,019 | 918 | 2,367 | 2,826 | 3,386 | 3,744 |
| Iowa | 2,140 | 2,029 | 5,470 | 5,406 | 7,610 | 7,435 |
| Wisconsin | 1,355 | 1,363 | 6,924 | 7,246 | 8,279 | 8,609 |
| Illinois | 4,796 | 4,418 | 14,786 | 17,204 | 19,582 | 21,622 |
| Indiana | 1,650 | 1,619 | 6,430 | 6,810 | 8,080 | 8,429 |
| Michigan | 1,980 | 2,209 | 12,582 | 11,504 | 14,562 | 13,713 |
| Ohio | 2,659 | 2,468 | 6,783 | 7,652 | 9,442 | 10,120 |
| Kentucky | 1,260 | 1,093 | 696 | 887 | 1,956 | 1,980 |
| Tennessee | 1,272 | 1,184 | 853 | 959 | 2,125 | 2,143 |
| Missouri | 1,899 | 2,005 | 4,923 | 6,105 | 6,822 | 8,110 |
| Kansas | 1,791 | 1,865 | 1,394 | 2,229 | 3,185 | 4,094 |
| Texas | 6,349 | 7,011 | 2,889 | 3,109 | 9,238 | 10,120 |
| Oklahoma | 1,400 | 1,168 | 529 | 403 | 1,929 | 1,571 |
| Arkansas | 1,014 | 998 | 1,148 | 840 | 2,162 | 1,838 |
| Louisiana | 3,184 | 3,236 | 837 | 1,032 | 4,021 | 4,268 |
| Mississippi | 676 | 660 | 334 | 342 | 1,010 | 1,002 |
| Alabama | 1,341 | 1,417 | 999 | 1,076 | 2,340 | 2,493 |
| Maine | 368 | 409 | 2,208 | 2,229 | 2,576 | 2,638 |
| New Hampshire | 210 | 68 | 1,735 | 1,387 | 1,945 | 1,455 |
| Vermont | 73 | 86 | 981 | 789 | 1,054 | 875 |
| Massachusetts | 1,563 | 1,478 | 18,178 | 19,441 | 19,741 | 20,919 |
| Rhode Island | 119 | 57 | 3,289 | 3,356 | 3,408 | 3,413 |
| Connecticut | 995 | 779 | 8,515 | 9,708 | 9,510 | 10,487 |
| New York | 5,535 | 5,526 | 39,717 | 40,376 | 45,252 | 45,902 |
| New Jersey | 3,365 | 3,734 | 23,628 | 25,021 | 26,993 | 28,755 |
| Pennsylvania | 3,905 | 3,429 | 16,944 | 18,769 | 20,849 | 22,198 |
| Delaware | 60 | 66 | 953 | 800 | 1,013 | 866 |
| Maryland | 1,303 | 1,146 | 6,388 | 7,296 | 7,691 | 8,442 |
| District of Columbia | 342 | 305 | 1,904 | 2,484 | 2,246 | 2,789 |
| Virginia | 2,115 | 1,871 | 3,265 | 3,448 | 5,380 | 5,319 |
| West Virginia | 284 | 364 | 270 | 221 | 554 | 585 |
| North Carolina | 1,390 | 1,221 | 2,101 | 1,999 | 3,491 | 3,220 |
| South Carolina | 756 | 779 | 874 | 883 | 1,630 | 1,662 |
| Georgia | 1,379 | 1,225 | 1,225 | 1,368 | 2,604 | 2,593 |
| Florida | 2,273 | 2,328 | 1,551 | 1,740 | 3,824 | 4,068 |
| Total United States | 87,919 | 85,505 | 241,277 | 256,468 | 329,196 | 341,973 |

[1] Includes grade No. 1 fuel oil sold as range oil.
[2] Revised.

TABLE B–35.—*Sales of residual fuels in 1948 and 1949*

[Thousands of barrels of 42 gallons]

TOTAL RESIDUAL FUEL OIL

| | Residual | | Crude oil | | Total | |
|---|---|---|---|---|---|---|
| | 1949 | 1948 [1] | 1949 | 1948 | 1949 | 1948 [1] |
| California | 76,632 | 78,468 | 539 | 613 | 77,171 | 79,081 |
| Oregon | 12,845 | 14,892 | | | 12,845 | 14,892 |
| Washington | 12,043 | 13,304 | | | 12,043 | 13,304 |
| Arizona | 1,087 | 1,841 | | | 1,087 | 1,841 |
| Nevada | 1,514 | 4,372 | | | 1,514 | 4,372 |
| Idaho | 480 | 456 | | | 480 | 456 |
| Montana | 3,680 | 4,935 | 22 | | 3,702 | 4,935 |
| Wyoming | 2,846 | 3,758 | 13 | 119 | 2,859 | 3,877 |
| Utah | 3,439 | 1,585 | | | 3,439 | 1,585 |
| Colorado | 783 | 886 | | | 783 | 886 |
| New Mexico | 454 | 674 | 6 | 11 | 460 | 685 |
| North Dakota | 358 | 447 | | | 358 | 447 |
| South Dakota | 262 | 288 | | | 262 | 288 |
| Minnesota | 1,467 | 1,314 | | 1 | 1,467 | 1,315 |
| Nebraska | 421 | 329 | 1 | | 422 | 329 |
| Iowa | 1,176 | 742 | | | 1,176 | 742 |
| Wisconsin | 1,514 | 1,497 | 1 | | 1,515 | 1,497 |
| Illinois | 14,987 | 15,157 | 83 | 119 | 15,070 | 15,276 |
| Indiana | 17,278 | 13,422 | 65 | 75 | 17,343 | 13,497 |
| Michigan | 11,002 | 11,051 | 1 | | 11,003 | 11,051 |
| Ohio | 16,269 | 16,082 | 10 | 7 | 16,279 | 16,089 |
| Kentucky | 1,117 | 1,303 | 62 | | 1,179 | 1,303 |
| Tennessee | 919 | 890 | | | 919 | 890 |
| Missouri | 5,090 | 6,364 | 170 | 245 | 5,260 | 6,609 |
| Kansas | 7,454 | 9,876 | 52 | 290 | 7,506 | 10,166 |
| Texas | 49,840 | 62,615 | 641 | 761 | 50,481 | 63,376 |
| Oklahoma | 6,296 | 7,437 | 142 | 286 | 6,438 | 7,723 |
| Arkansas | 1,832 | 2,079 | 1 | 1 | 1,833 | 2,080 |
| Louisiana | 15,088 | 19,174 | 132 | 260 | 15,220 | 19,434 |
| Mississippi | 272 | 319 | 42 | 92 | 314 | 411 |
| Alabama | 1,891 | 2,296 | | | 1,891 | 2,296 |
| Maine | 2,704 | 2,342 | | | 2,704 | 2,342 |
| New Hampshire | 1,175 | 909 | | | 1,175 | 909 |
| Vermont | 280 | 258 | 1 | | 281 | 258 |
| Massachusetts | 23,476 | 18,078 | | 4 | 23,476 | 18,082 |
| Rhode Island | 8,508 | 7,904 | | 13 | 8,508 | 7,917 |
| Connecticut | 14,515 | 10,066 | | | 14,515 | 10,066 |
| New York | 49,165 | 45,871 | 3 | | 49,168 | 45,871 |
| New Jersey | 37,972 | 33,661 | 1 | 19 | 37,973 | 33,680 |
| Pennsylvania | 35,384 | 37,240 | 7 | | 35,391 | 37,240 |
| Delaware | 1,921 | 1,043 | | | 1,921 | 1,043 |
| Maryland | 13,521 | 13,276 | | | 13,521 | 13,276 |
| District of Columbia | 1,427 | 855 | | | 1,427 | 855 |
| Virginia | 12,199 | 10,590 | 1 | | 12,200 | 10,590 |
| West Virginia | 1,264 | 1,171 | 2 | | 1,266 | 1,171 |
| North Carolina | 560 | 461 | | | 560 | 461 |
| South Carolina | 2,610 | 2,496 | | | 2,610 | 2,496 |
| Georgia | 4,227 | 3,375 | | | 4,227 | 3,375 |
| Florida | 15,671 | 16,132 | | | 15,671 | 16,132 |
| Total United States | 496,915 | 503,581 | 1,998 | 2,916 | 498,913 | 506,497 |

[1] Revised.

NOTE.—Includes heavy Diesel oil sales reported under vessels.

TABLE B–36.—*Sales of Kerosene by States and uses, 1948 and 1949*

[Thousands of barrels of 42 gallons]

KEROSENE

| | Sold as range oil | | Tractor fuel | | All other uses [1] | | Total | |
|---|---|---|---|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 |
| California | 306 | 493 | | | 2,356 | 2,323 | 2,662 | 2,816 |
| Oregon | 32 | 52 | | | 267 | 254 | 299 | 306 |
| Washington | 27 | 106 | | | 416 | 331 | 443 | 437 |
| Arizona | 10 | 22 | | | 99 | 242 | 109 | 264 |
| Nevada | 2 | 3 | | | 34 | 11 | 36 | 14 |
| Idaho | 24 | 17 | 6 | 4 | 23 | 15 | 53 | 36 |
| Montana | 61 | 62 | 49 | 45 | 62 | 125 | 172 | 232 |
| Wyoming | 54 | 21 | 12 | 14 | 168 | 187 | 234 | 222 |
| Utah | 11 | 17 | 6 | 3 | 10 | 7 | 27 | 27 |
| Colorado | 85 | 105 | 68 | 76 | 58 | 77 | 211 | 258 |
| New Mexico | 134 | 209 | 7 | 28 | 96 | 152 | 237 | 389 |
| North Dakota | 166 | 178 | 89 | 132 | 91 | 145 | 346 | 455 |
| South Dakota | 141 | 201 | 95 | 151 | 87 | 130 | 323 | 482 |
| Minnesota | 543 | 678 | 123 | 180 | 440 | 546 | 1,106 | 1,404 |
| Nebraska | 356 | 453 | 92 | 132 | 152 | 296 | 600 | 881 |
| Iowa | 806 | 734 | 526 | 666 | 1,176 | 1,161 | 2,508 | 2,561 |
| Wisconsin | 604 | 612 | 219 | 342 | 587 | 730 | 1,410 | 1,684 |
| Illinois | 2,562 | 2,914 | 361 | 432 | 1,883 | 2,272 | 4,806 | 5,618 |
| Indiana | 1,141 | 539 | 176 | 216 | 2,401 | 1,895 | 3,718 | 2,650 |
| Michigan | 832 | 901 | 257 | 388 | 1,888 | 1,364 | 2,977 | 2,653 |
| Ohio | 954 | 1,116 | 74 | 122 | 632 | 864 | 1,660 | 2,102 |
| Kentucky | 356 | 436 | 66 | 62 | 736 | 885 | 1,158 | 1,383 |
| Tennessee | 1,137 | 850 | 145 | 194 | 784 | 975 | 2,066 | 2,019 |
| Missouri | 747 | 825 | 53 | 66 | 715 | 1,130 | 1,515 | 2,021 |
| Kansas | 335 | 331 | 219 | 264 | 356 | 552 | 910 | 1,147 |
| Texas | 1,883 | 1,856 | 450 | 557 | 2,831 | 3,570 | 5,164 | 5,983 |
| Oklahoma | 707 | 616 | 138 | 174 | 872 | 1,000 | 1,717 | 1,790 |
| Arkansas | 755 | 727 | 125 | 148 | 676 | 843 | 1,556 | 1,718 |
| Louisiana | 574 | 441 | 162 | 224 | 726 | 987 | 1,462 | 1,652 |
| Mississippi | 358 | 401 | 149 | 160 | 648 | 729 | 1,155 | 1,290 |
| Alabama | 505 | 480 | 96 | 95 | 695 | 831 | 1,296 | 1,406 |
| Maine | 2,172 | 2,465 | 19 | 7 | 146 | 97 | 2,337 | 2,569 |
| New Hampshire | 1,235 | 1,616 | 14 | 2 | 78 | 33 | 1,327 | 1,651 |
| Vermont | 778 | 805 | 13 | | 71 | 81 | 862 | 886 |
| Massachusetts | 12,794 | 13,955 | 67 | 4 | 497 | 620 | 13,358 | 14,579 |
| Rhode Island | 2,705 | 3,136 | 14 | | 98 | 86 | 2,817 | 3,222 |
| Connecticut | 4,056 | 4,954 | 23 | 6 | 177 | 131 | 4,256 | 5,091 |
| New York | 9,169 | 10,225 | 97 | 132 | 824 | 1,045 | 10,090 | 11,402 |
| New Jersey | 4,291 | 5,704 | 25 | 41 | 970 | 1,365 | 5,286 | 7,110 |
| Pennsylvania | 2,179 | 2,435 | 135 | 231 | 1,262 | 1,429 | 3,576 | 4,095 |
| Delaware | 629 | 299 | 3 | 21 | 32 | 89 | 664 | 409 |
| Maryland | 1,227 | 1,286 | 19 | 37 | 582 | 701 | 1,828 | 2,024 |
| District of Columbia | 324 | 293 | 3 | 6 | 124 | 152 | 451 | 451 |
| Virginia | 1,530 | 1,010 | 35 | 67 | 853 | 931 | 2,418 | 2,008 |
| West Virginia | 191 | 86 | 3 | 4 | 249 | 281 | 443 | 371 |
| North Carolina | 3,082 | 2,264 | 280 | 345 | 1,359 | 1,178 | 4,721 | 3,787 |
| South Carolina | 1,183 | 882 | 58 | 84 | 952 | 1,098 | 2,193 | 2,064 |
| Georgia | 1,105 | 1,253 | 178 | 176 | 544 | 752 | 1,827 | 2,181 |
| Florida | 1,386 | 1,565 | 91 | 138 | 794 | 984 | 2,271 | 2,687 |
| Total United States | 66,244 | 70,629 | 4,840 | 6,176 | 31,577 | 35,682 | 102,661 | 112,487 |

[1] Includes jet propulsion.

TABLE B–37.—*Sales of range oil by States, 1948–49*

[Thousands of barrels of 42 gallons]

RANGE OIL

| | Kerosene | | Grade No. 1 fuel oil [1] | | Total | |
|---|---|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 |
| California | 306 | 493 | | | 306 | 493 |
| Oregon | 32 | 52 | | | 32 | 52 |
| Washington | 27 | 106 | | | 27 | 106 |
| Arizona | 10 | 22 | | | 10 | 22 |
| Nevada | 2 | 3 | | | 2 | 3 |
| Idaho | 24 | 17 | 43 | 68 | 67 | 85 |
| Montana | 61 | 62 | 108 | 231 | 169 | 293 |
| Wyoming | 54 | 21 | 10 | 59 | 64 | 80 |
| Utah | 11 | 17 | 29 | 51 | 40 | 68 |
| Colorado | 85 | 105 | 102 | 245 | 187 | 350 |
| New Mexico | 134 | 209 | 12 | 11 | 146 | 220 |
| North Dakota | 166 | 178 | 46 | 229 | 212 | 407 |
| South Dakota | 141 | 201 | 104 | 179 | 245 | 380 |
| Minnesota | 543 | 678 | 892 | 1,147 | 1,435 | 1,825 |
| Nebraska | 356 | 453 | 176 | 212 | 532 | 665 |
| Iowa | 806 | 734 | 749 | 791 | 1,555 | 1,525 |
| Wisconsin | 604 | 612 | 1,140 | 1,150 | 1,744 | 1,762 |
| Illinois | 2,562 | 2,914 | 2,440 | 2,571 | 5,002 | 5,485 |
| Indiana | 1,141 | 539 | 568 | 543 | 1,709 | 1,082 |
| Michigan | 832 | 901 | 1,435 | 980 | 2,267 | 1,881 |
| Ohio | 954 | 1,116 | 297 | 269 | 1,251 | 1,385 |
| Kentucky | 356 | 436 | 2 | 10 | 358 | 446 |
| Tennessee | 1,137 | 850 | 51 | 73 | 1,188 | 923 |
| Missouri | 747 | 825 | 722 | 729 | 1,469 | 1,554 |
| Kansas | 335 | 331 | 161 | 139 | 496 | 470 |
| Texas | 1,883 | 1,856 | 81 | 169 | 1,964 | 2,025 |
| Oklahoma | 707 | 616 | 107 | 44 | 814 | 660 |
| Arkansas | 755 | 727 | 137 | 145 | 892 | 872 |
| Louisiana | 574 | 441 | 85 | 53 | 659 | 494 |
| Mississippi | 358 | 401 | 11 | 18 | 369 | 419 |
| Alabama | 505 | 480 | 25 | 81 | 530 | 561 |
| Maine | 2,172 | 2,465 | 108 | 209 | 2,280 | 2,674 |
| New Hampshire | 1,235 | 1,616 | 64 | 57 | 1,299 | 1,673 |
| Vermont | 778 | 805 | 25 | | 803 | 805 |
| Massachusetts | 12,794 | 13,955 | 692 | 843 | 13,486 | 14,798 |
| Rhode Island | 2,705 | 3,136 | 106 | 175 | 2,811 | 3,311 |
| Connecticut | 4,056 | 4,954 | 305 | 391 | 4,361 | 5,345 |
| New York | 9,169 | 10,225 | 421 | 507 | 9,590 | 10,732 |
| New Jersey | 4,291 | 5,704 | 410 | 336 | 4,701 | 6,040 |
| Pennsylvania | 2,179 | 2,435 | 228 | 381 | 2,407 | 2,816 |
| Delaware | 629 | 299 | | | 629 | 299 |
| Maryland | 1,227 | 1,286 | 7 | 5 | 1,234 | 1,291 |
| District of Columbia | 324 | 293 | 1 | 1 | 325 | 294 |
| Virginia | 1,530 | 1,010 | 98 | 86 | 1,628 | 1,096 |
| West Virginia | 191 | 86 | 2 | 4 | 193 | 90 |
| North Carolina | 3,082 | 2,264 | 59 | 61 | 3,141 | 2,325 |
| South Carolina | 1,183 | 882 | 61 | 74 | 1,244 | 956 |
| Georgia | 1,105 | 1,253 | 85 | 110 | 1,190 | 1,363 |
| Florida | 1,386 | 1,565 | 74 | 97 | 1,460 | 1,662 |
| Total United States | 66,244 | 70,629 | 12,279 | 13,534 | 78,523 | 84,163 |

[1] Included in distillate fuel oil totals, table 18.

TABLE B–38.—*Regional distribution of distillate fuel-oil sales*

[Thousands of barrels of 42 gallons]

| Region | 1945 | 1946 | 1947 | [1] 1948 | 1949 | Percent change, 1949 to 1948 |
|---|---|---|---|---|---|---|
| Pacific Coast | 28,234 | 32,019 | 37,927 | 42,464 | 41,583 | −2.1 |
| Rocky Mountain | 6,010 | 5,631 | 6,992 | 9,057 | 8,903 | −1.7 |
| North Central | 53,810 | 59,694 | 79,793 | 90,770 | 88,242 | −2.8 |
| South Central | 34,724 | 26,406 | 26,928 | 33,496 | 30,707 | −8.3 |
| New England | 23,553 | 25,886 | 35,783 | 39,787 | 38,234 | −3.9 |
| Middle Atlantic | 75,887 | 78,238 | 95,882 | 108,952 | 104,044 | −4.5 |
| South Atlantic | 9,407 | 11,676 | 14,709 | 17,447 | 17,483 | +.2 |
| Total | 231,625 | 239,550 | 298,014 | 341,973 | 329,196 | −3.7 |

[1] Revised.

TABLE B–39.—*Regional percentages of distillate fuel oil*

| Region | 1945 | 1946 | 1947 | [1] 1948 | 1949 |
|---|---|---|---|---|---|
| Pacific Coast | 12.2 | 13.4 | 12.7 | 12.4 | 12.7 |
| Rocky Mountain | 2.6 | 2.3 | 2.4 | 2.7 | 2.7 |
| North Central | 23.2 | 24.9 | 26.8 | 26.5 | 26.8 |
| South Central | 15.0 | 11.0 | 9.0 | 9.8 | 9.3 |
| New England | 10.2 | 10.8 | 12.0 | 11.6 | 11.6 |
| Middle Atlantic | 32.7 | 32.7 | 32.2 | 31.9 | 31.6 |
| South Atlantic | 4.1 | 4.9 | 4.9 | 5.1 | 5.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Revised.

TABLE B–40.—*Regional distribution of residual fuel-oil sales*

[Thousands of barrels of 42 gallons]

| Region | 1945 | 1946 | 1947 | [1] 1948 | 1949 | Percent change, 1949 to 1948 |
|---|---|---|---|---|---|---|
| Pacific Coast | 169,666 | 127,998 | 129,995 | 113,490 | 104,660 | −7.8 |
| Rocky Mountain | 15,362 | 14,802 | 13,189 | 12,424 | 11,723 | −5.6 |
| North Central | 52,806 | 53,281 | 59,058 | 62,724 | 66,993 | +6.8 |
| South Central | 126,000 | 108,592 | 113,934 | 112,095 | 88,943 | −20.7 |
| New England | 26,011 | 30,633 | 36,932 | 39,564 | 50,659 | +28.0 |
| Middle Atlantic | 126,515 | 125,012 | 134,061 | 131,965 | 139,401 | +5.6 |
| South Atlantic | 25,905 | 26,742 | 33,360 | 34,225 | 36,534 | +6.7 |
| Total | 542,265 | 487,060 | 520,529 | 506,497 | 498,913 | −1.5 |

[1] Revised.

TABLE B–41.—*Regional percentages of residual fuel-oil sales*

| Region | 1945 | 1946 | 1947 | [1] 1948 | 1949 |
|---|---|---|---|---|---|
| Pacific Coast | 31.3 | 26.3 | 25.0 | 22.4 | 21.0 |
| Rocky Mountain | 2.8 | 3.0 | 2.5 | 2.5 | 2.4 |
| North Central | 9.8 | 10.9 | 11.3 | 12.4 | 13.4 |
| South Central | 23.2 | 22.3 | 21.9 | 22.1 | 17.8 |
| New England | 4.8 | 6.3 | 7.1 | 7.8 | 10.2 |
| Middle Atlantic | 23.3 | 25.7 | 25.8 | 26.1 | 27.9 |
| South Atlantic | 4.8 | 5.5 | 6.4 | 6.7 | 7.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Revised.

TABLE B–42.—*Regional distribution of kerosene sales*

[Thousands of barrels of 42 gallons]

| Region | 1945 | 1946 | 1947 | 1948 | 1949 | Percent change in 1849 to 1948 |
|---|---|---|---|---|---|---|
| Pacific Coast | 2,298 | 2,166 | 2,844 | 3,837 | 3,549 | −7.5 |
| Rocky Mountain | 692 | 895 | 989 | 1,164 | 934 | −19.8 |
| North Central | 16,264 | 18,959 | 22,077 | 23,892 | 22,678 | −5.1 |
| South Central | 12,185 | 14,755 | 16,246 | 17,007 | 14,775 | −13.1 |
| New England | 19,892 | 23,433 | 26,293 | 27,998 | 24,957 | −10.9 |
| Middle Atlantic | 17,088 | 19,925 | 22,827 | 25,491 | 21,895 | −14.1 |
| South Atlantic | 6,557 | 7,957 | 11,427 | 13,098 | 13,873 | +5.9 |
| Total | 74,976 | 88,090 | 102,703 | 112,487 | 102,661 | −8.7 |

TABLE B–43.—*Regional percentages of kerosene sales*

| Region | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|
| Pacific Coast | 3.1 | 2.5 | 2.8 | 3.4 | 3.5 |
| Rocky Mountain | .9 | 1.0 | 1.0 | 1.0 | .9 |
| North Central | 21.7 | 21.5 | 21.5 | 21.2 | 22.1 |
| South Central | 16.3 | 16.8 | 15.8 | 15.1 | 14.4 |
| New England | 26.5 | 26.6 | 25.6 | 24.9 | 24.3 |
| Middle Atlantic | 22.8 | 22.6 | 22.2 | 22.7 | 21.3 |
| South Atlantic | 8.7 | 9.0 | 11.1 | 11.7 | 13.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

TABLE B–44.—*Regional distribution of range-oil sales* [1]

[Thousands of barrels of 42 gallons]

| Region | 1945 | 1946 | 1947 | [1] 1948 | 1949 | Percent change in 1949 to 1948 |
|---|---|---|---|---|---|---|
| Pacific Coast | 475 | 369 | 307 | 676 | 377 | −44.2 |
| Rocky Mountain | 623 | 833 | 1,048 | 1,096 | 673 | −38.6 |
| North Central | 9,958 | 11,452 | 15,160 | 17,766 | 17,498 | −1.5 |
| South Central | 3,525 | 4,460 | 5,811 | 7,055 | 7,193 | +2.0 |
| New England | 20,201 | 23,558 | 26,767 | 28,606 | 25,040 | −12.5 |
| Middle Atlantic | 13,202 | 16,037 | 18,652 | 21,472 | 18,886 | −12.0 |
| South Atlantic | 3,037 | 3,855 | 6,369 | 7,492 | 8,856 | +18.2 |
| Total | 51,021 | 60,564 | 74,114 | 84,163 | 78,523 | −6.7 |

[1] Includes kerosene sold as range oil.

TABLE B–45.—*Regional percentages of range-oil sales* [1]

| Region | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|
| Pacific Coast | 0.9 | 0.6 | 0.4 | 0.8 | 0.5 |
| Rocky Mountain | 1.2 | 1.4 | 1.4 | 1.3 | .8 |
| North Central | 19.5 | 18.9 | 20.5 | 21.1 | 22.3 |
| South Central | 6.9 | 7.3 | 7.8 | 8.4 | 9.2 |
| New England | 39.6 | 38.9 | 36.1 | 34.0 | 31.9 |
| Middle Atlantic | 25.9 | 26.5 | 25.2 | 25.5 | 24.0 |
| South Atlantic | 6.0 | 6.4 | 8.6 | 8.9 | 11.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Includes kerosene sold as range oil.

### 3. Energy Consumption—By Type of Fuel

A second method of examining the trends in fuel consumption is to look at the type of fuel employed by various segments of the economy. Have they utilized different fuels in constant proportions? Or have they shown preference trends toward one source at the expense of another?

A look at the energy-consumption trend of manufacturing industries, for instance, indicates first and most significantly the tremendous rise in total fuel consumption. The sharp upward trend holds for all sources of energy except anthracite coal, which has dropped down to half its 1909 level. The use of bituminous coal for heat and power purposes only, also declined, but when its utilization as raw material for manufacturing and processing is included, its 1947 consumption exceeded all earlier years except 1923. The consumption of all types of gas, has increased more than tenfold since 1909, to which steeply climbing use of natural gas, both straight and in mixed gas, has contributed most generously. Mixed gas used in 1947 amounted to 70 times that used in 1939.

Natural gas consumption in that period doubled as a source of heat and power for manufacturing industries. It showed a slightly smaller gain when its raw material utilization is included.

Electric energy purchased over the period 1929–47 for which the data are available had nearly tripled. Over the more recent, briefer 8-year period, 1939–47 it has more than doubled.

Total energy consumption of manufacturing industries in 1947 was not quite twice the total consumed in 1939.

The extent to which the rate of increase in consumption of individual fuels differs from the rate of increase in total energy consumption gives, for this period, an indication of the directions of fuel consumption trends. On that basis, rates of growth of consumption of mixed gas, electric energy, and natural gas—in that order—exceeded the total energy growth rate for 1939–47, presumably at the expense of a similar consumption expansion of other fuels.

A dissection of industrial energy consumption by industry and by type of fuel will furnish some clues to possible future changes in the pattern. The present consumption pattern for each industry is determined by a number of factors. For instance, the basic metal industries, primarily steel, are the chief consumers of coke. Since coke is used for metallurgical purposes, there is at present not much prospect that the industry will be able to turn to another fuel, because it knows of none which can perform the function of coke in the blast furnace. This same category of primary metal industries is the chief consumer of manufactured gas and mixed gas. The reason here is not the function which this gas performs, but the location of the industry and the type of gas. Most of this manufactured gas is a byproduct of the steel industry's coke ovens, which are usually closely associated with the basic steel-making facilities. It is little wonder, therefore, that the industry draws heavily on this source of fuel. Since in 1947 coke-oven gas contributed more than one-third to the total manufactured gas produced, it is easily seen that this gas would indeed bulk large in total industrial consumption.

That the primary metal industries rank high in the consumption of other fuels also is the result of their operating needs for high temperatures, and of the over-all size of the industry classification.

TABLE C–1.—*Fuels consumed and electric energy purchased and generated by manufacturing industries, totals for the United States: 1947 and*

TABLE C–1.—*Fuels consumed and electric energy purchased and generated by manufacturing industries, totals for the United States: 1947 and earlier census years*

| Kind | Unit of measure | Fuels and electric energy purchased [1] | | Fuels and electric energy used for all purposes [2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1947 | 1939 | 1947 | 1939 | 1937 | 1929 | 1927 | 1923 | 1919 | 1914 | 1909 |
| Fuels: | | | | | | | | | | | | |
| Bituminous coal | Thousand tons | 103, 788 | 57, 170 | 210, 140 | 138, 182 | 162, 961 | 196, 780 | 199, 705 | 222, 848 | 188, 836 | 154, 847 | 151, 123 |
| Anthracite | do | 7, 081 | 4, 971 | 8, 781 | 5, 168 | 6, 562 | 9, 452 | | | 13, 740 | 14, 045 | 14, 470 |
| Coke | do | 66, 171 | 35, 001 | 68, 722 | 36, 745 | 43, 508 | 51, 406 | [3] | [3] | 41, 785 | 32, 750 | 38, 530 |
| Fuel oils | Thousand barrels | 166, 947 | 97, 362 | 215, 559 | 133, 404 | 136, 255 | 132, 221 | [3] | [3] | 69, 639 | 32, 670 | 19, 727 |
| Gas: | | | | | | | | | | | | |
| Natural | Million cubic feet | 1, 238, 311 | 633, 245 | 1, 723, 193 | 980, 515 | 2, 789, 089 | 673, 765 | [3] | [3] | 565, 797 | 373, 695 | 308, 877 |
| Manufactured | do | 1, 347, 763 | 1, 185, 633 | 2, 208, 811 | 1, 806, 164 | | 1, 500, 426 | [3] | [3] | | | |
| Mixed | do | 1, 418, 879 | 21, 528 | 1, 418, 879 | 21, 528 | | | [3] | [3] | | | |
| Other fuels | | [3] | [3] | [3] | [3] | [3] | [3] | [3] | [3] | [3] | [3] | [3] |
| Electric energy: | | | | | | | | | | | | |
| Purchased | Million kilowatt-hours | 102, 822 | 44, 847 | 102, 822 | 44, 847 | 45, 949 | 36, 427 | [3] | [3] | [3] | [3] | [3] |
| Generated | do | | | 43, 936 | 25, 829 | [3] | [3] | [3] | [3] | [3] | [3] | [3] |
| Generated and sold | do | | | 5, 811 | 2, 922 | [3] | [3] | [3] | [3] | [3] | [3] | [3] |

[1] Represents fuels and electric energy purchased by manufacturing establishments and used for heat and power. Excludes fuels used as a raw material, such as coal used in making coke and natural gas used in making carbon black.

[2] Represents fuels and electric energy used by manufacturing establishments for heat, power, and as a raw material for further manufacture. Includes fuels and electric energy produced and consumed in the same establishment (except blast-furnace gas used at blast furnaces). Figures for 1939 and earlier years have been revised and supplemented by Bureau of Mines data for operations for which adequate census figures had not been obtained. The most significant revisions were made in the figures for petroleum refining, coke ovens, and carbon black.

[3] Not available.

Source: Census of Manufactures, 1947.

TABLE C–2.—*Fuels consumed and electric energy purchased and generated by industry groups and industries: 1947*

[Money figures in thousands of dollars]

| Industry group and industry | | Total cost of fuels and purchased electric energy | Coal | | Coke (thousand tons) | Fuel oils (thousand barrels) | Gas | | | Other fuels [1]—cost | Electric energy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Title | | Bituminous (thousand tons) | Anthracite (thousand tons) | | | Natural (million cubic feet) | Manufactured (million cubic feet) | Mixed (million cubic feet) | | Purchased (million kilowatt-hours) | Generated (million kilowatt-hours) | Sold (million kilowatt-hours) |
| | All industries, total | $3,331,518 | 103,788 | 7,081 | 66,171 | 166,947 | 1,238,311 | 1,347,763 | 1,418,879 | $96,457 | 102,822 | 43,936 | 5,811 |
| | INDUSTRY GROUPS | | | | | | | | | | | | |
| 20 | Food and kindred products | 278,783 | 12,495 | 774 | 195 | 15,314 | 108,785 | 11,992 | 4,935 | 11,067 | 8,427 | 1,838 | 85 |
| 21 | Tobacco manufactures | 6,036 | 463 | 26 | (2) | 121 | 44 | 25 | 7 | 73 | 155 | 76 | 12 |
| 22 | Textile mill products | 166,492 | 5,938 | 674 | 18 | 11,320 | 5,435 | 1,230 | 60 | 674 | 8,288 | 1,959 | 206 |
| 23 | Apparel and related products | 29,728 | 483 | 128 | 5 | 732 | 2,000 | 980 | 265 | 480 | 837 | 18 | 5 |
| 24 | Lumber and products, except furniture | 67,798 | 855 | 21 | (2) | 3,251 | 3,185 | 42 | 39 | 30,310 | 1,503 | 1,004 | 169 |
| 25 | Furniture and fixtures | 21,568 | 967 | 50 | 6 | 436 | 2,002 | 593 | 429 | 322 | 705 | 128 | 7 |
| 26 | Paper and allied products | 198,276 | 13,501 | 1,374 | 12 | 11,908 | 68,940 | 512 | 1,290 | 4,273 | 6,175 | 9,626 | 415 |
| 27 | Printing and publishing industries | 35,205 | 288 | 83 | 4 | 745 | 4,581 | 2,364 | 1,146 | 2,579 | 1,251 | 39 | 10 |
| 28 | Chemicals and allied products | 296,604 | 17,709 | 1,279 | 2,113 | 16,673 | 154,824 | 12,817 | 6,441 | 4,443 | 11,963 | 8,058 | 411 |
| 29 | Petroleum and coal products | 96,691 | 2,442 | 130 | 41 | 3,630 | 414,469 | 255,447 | 26,956 | 2,534 | 3,753 | 3,246 | 501 |
| 30 | Rubber products | 45,912 | 2,712 | 130 | 3 | 1,460 | 7,656 | 210 | 66 | 109 | 2,650 | 810 | 15 |
| 31 | Leather and leather products | 20,718 | 1,154 | 66 | 3 | 753 | 448 | 264 | 20 | 200 | 475 | 117 | 19 |
| 32 | Stone, clay, and glass products | 257,748 | 16,601 | 384 | 370 | 14,679 | 222,334 | 16,078 | 11,373 | 4,672 | 5,865 | 2,155 | 122 |
| 33 | Primary metal industries | 1,317,136 | 14,483 | 1,186 | 61,797 | 64,372 | 168,387 | 1,016,313 | 1,318,764 | 24,021 | 31,428 | 11,851 | 2,634 |
| 34 | Fabricated metal products | 111,608 | 2,175 | 132 | 405 | 5,230 | 29,690 | 10,418 | 5,408 | 1,961 | 3,739 | 170 | 8 |
| 35 | Machinery (except electrical) | 146,971 | 3,990 | 205 | 650 | 6,260 | 25,637 | 5,938 | 5,252 | 2,467 | 5,401 | 579 | 59 |
| 36 | Electrical machinery | 64,420 | 1,914 | 187 | 188 | 2,268 | 6,587 | 3,911 | 2,387 | 764 | 3,156 | 574 | 114 |
| 37 | Transportation equipment | 124,695 | 4,446 | 86 | 346 | 5,258 | 20,011 | 5,101 | 33,173 | 4,977 | 5,552 | 1,497 | 988 |
| 38 | Instruments and related products | 12,459 | 360 | 25 | 2 | 567 | 503 | 1,583 | 265 | 94 | 456 | 90 | 1 |
| 39 | Miscellaneous manufactures [3] | 33,270 | 812 | 141 | 13 | 1,970 | 1,793 | 1,945 | 603 | 437 | 1,043 | 101 | 30 |

n. a.—Not available. Less than 500.

[1] Represents mixtures of natural and manufactured gas. Includes all gas reported by establishments that purchase more than one type of gas. Also includes some gas for which the type was not reported.

[2] The principal fuels included are gasoline, liquefied petroleum gas, and wood. For "Distilled liquors, except brandy," "Lumber and products (except furniture)," "Printing and publishing industries," and "Gum naval stores (steam distilled)," includes cost of some coal, coke, fuel oil, and gas for which separate figures by type of fuel were not reported.

[3] Excludes statistics for establishments reported on short forms, representing between 3 and 6 percent of the total employment in the industry.

Source: Census of Manufactures, 1947.

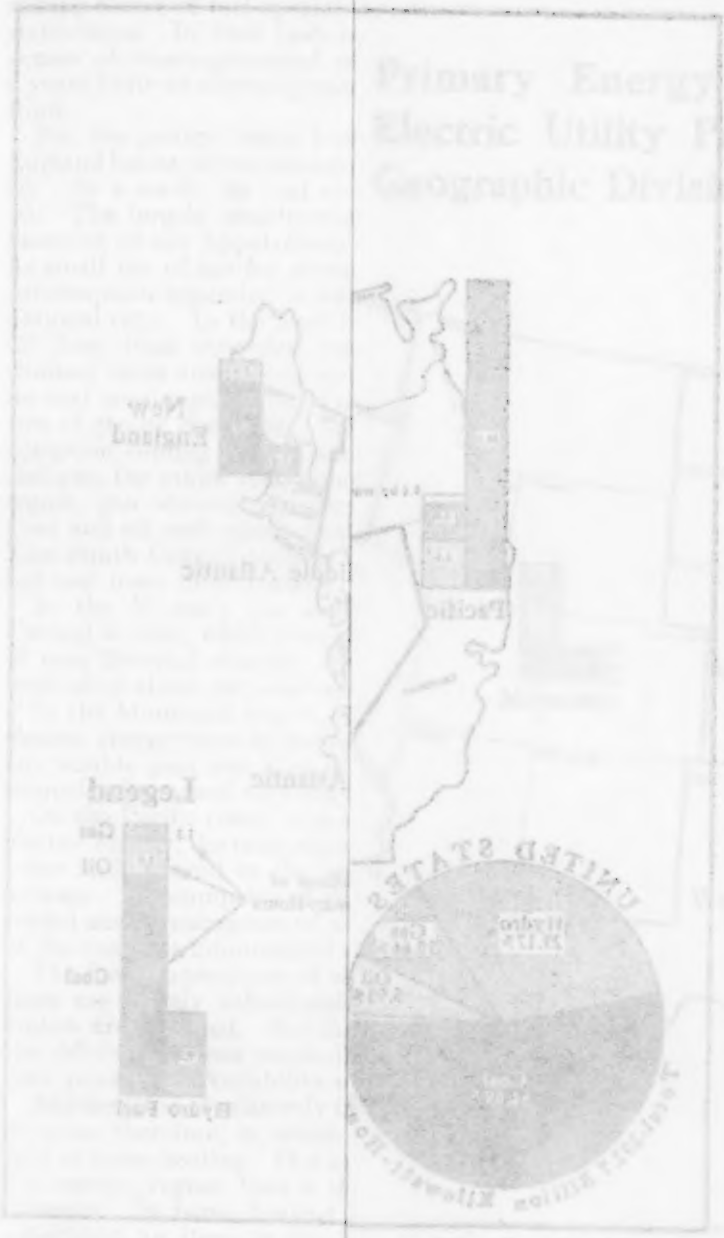
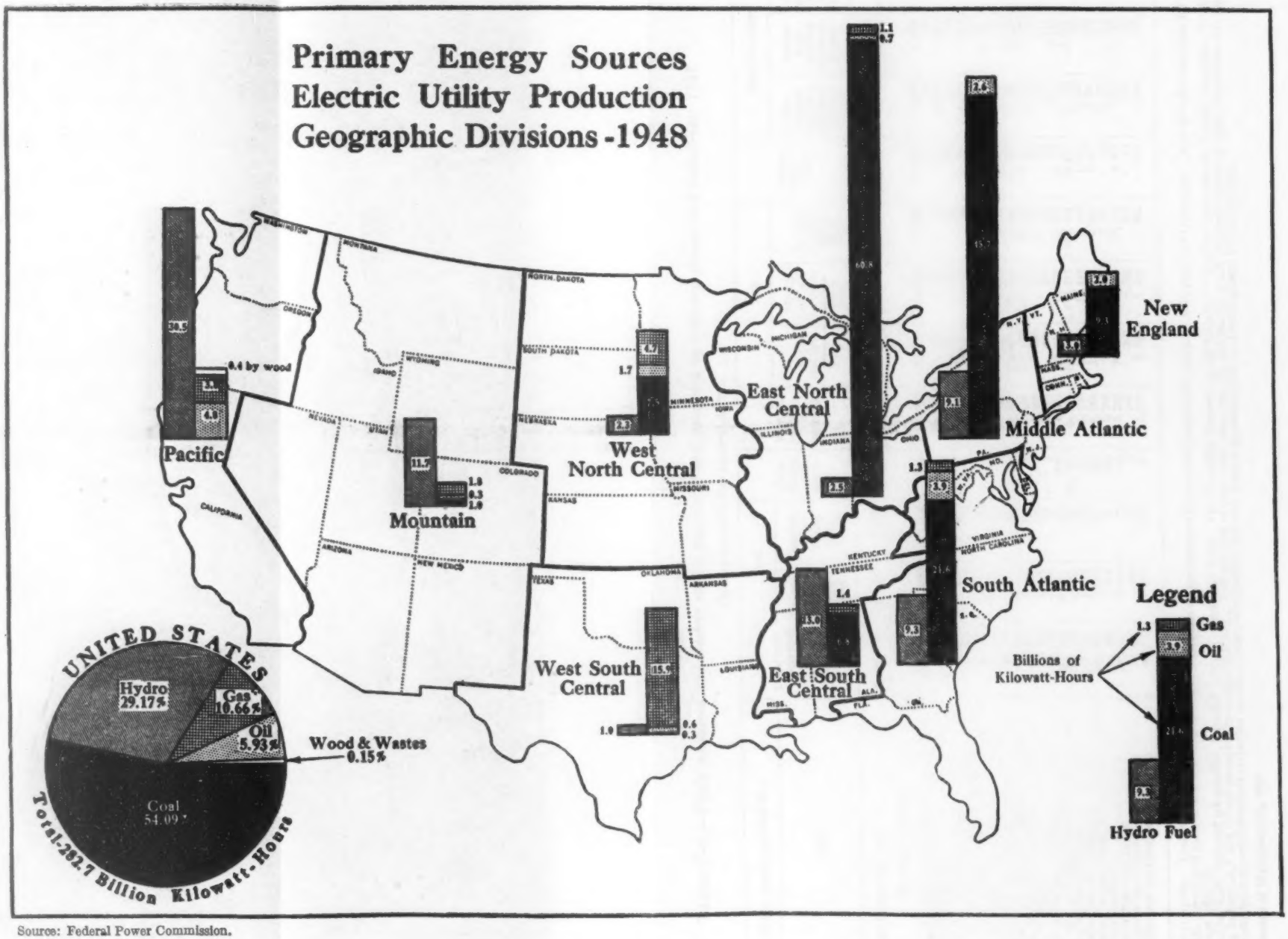


FIGURE C–1.




Source: Federal Power Commission.

The electric utility industry should be examined separately because its chief, and almost only, raw material is fuel, and the factors determining choice of fuel operate more distinctly—except during wartime restrictions. In 1949 fuels constituted almost one-third of total expenses of steam-generated plants. Consumption of gas during the 8 years 1940–48 showed greatest gain, with oil second, and coal a poor third.

But the picture varies from region to region in this period. New England has as yet no natural gas. It does not have access to cheap fuel oil. As a result, its coal consumption increased more than that of oil. The largely coal-burning Mid-Atlantic region, due to the exhaustion of the Appalachian gas fields, actually showed a decline in its small use of gas for electric energy production, while coal and oil consumption expanded at similar rates, but the latter at less than the national rate. In the East North Central region the consumption of all three fuels expanded dramatically; expansion in the use of oil climbed most steeply—it quadrupled. But the region also doubled its coal consumption—its primary fuel—and increased its consumption of gas by one-third. In the West North Central region, oil consumption, coming up from behind, tripled; coal, a small factor, doubled, and gas, the major fuel, almost doubled, too. In the South Atlantic region, gas showed the biggest growth. Its consumption tripled. Coal and oil each about doubled. Gas showed the same gain in the East South Central section, where oil consumption actually declined but coal more than doubled.

In the Nation's gas and oil-producing center, the West South Central section, which is overwhelmingly gas-burning, the minute use of coal dropped sharply, while use of oil doubled and that of gas multiplied about two and one-half times.

In the Mountain region, which receives the great majority of its electric energy from hydro plants, the only fuel consumption showing any sizable gain was that of natural gas, which tripled. Coal consumption increased very slightly and oil consumption dropped.

On the Pacific coast, where hydro power again is the chief source of electric energy, the total expansion in energy output was so great that other fuels shared in the trend at rates far exceeding the national average. Consumption of gas for electricity output more than quadrupled and consumption of oil expanded about 15 times. The burning of the coal was infinitesimal and erratic.

The fuel consumption of electric utility plants is an instance where fuels are largely substitutable for each other, provided the proper boilers are installed. For that reason the trends in utility fuel uses in the different regions markedly illustrate the effect of factors of location, price, and availability on the total consumption pattern.

Another area of relatively facile substitution of one fuel for another—an area, therefore, in which interfuel competition is high—is in the field of home heating. One interesting example is the so-called anthracite market region, that is the States adjacent to northeastern Pennsylvania. In home heating, of course, the fuel cost is not quite so significant an item to the householder as it is in electric utilities. Furthermore, having acquired a season's fuel stock to feed the installed heating equipment, small changes in fuel prices cannot so rapidly produce a switch in source of heat. The user will want to consume his stock, and then consider the cost of converting his burner.

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TABLE C–3.—*Consumption of fuel for the production of electric energy*

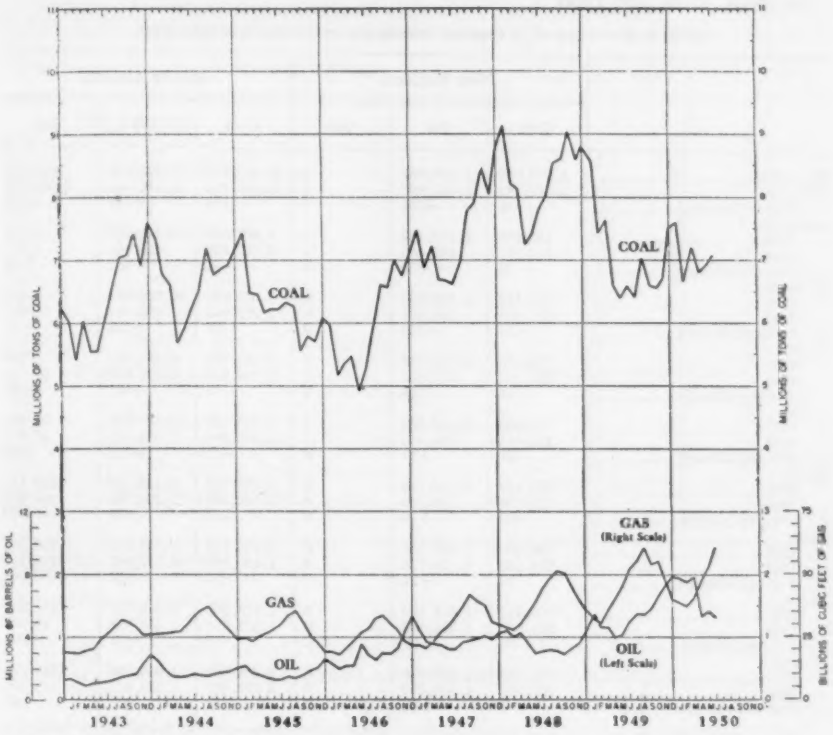
| | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|
| United States: | | | | | | | | | |
| Coal.....1,000 tons.. | 53,398 | 62,668 | 68,422 | 79,673 | 80,084 | 74,725 | 72,197 | 89,531 | 99,586 |
| Oil.....1,000 barrels.. | 16,772 | 20,077 | 15,281 | 18,036 | 20,862 | 20,228 | 36,316 | 45,309 | 42,645 |
| Gas....1,000 cubic feet.. | 183,157 | 201,763 | 238,736 | 305,594 | 358,784 | 326,212 | 306,942 | 373,054 | 478,097 |

| | 1940 [1] | 1942 | 1943 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|
| New England: | | | | | | | |
| Coal | 2,915 | 4,464 | 4,873 | 4,100 | 4,027 | 4,905 | 5,604 |
| Oil | 4,299 | 2,804 | 1,528 | 2,771 | 5,476 | 5,616 | 5,441 |
| Gas | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Middle Atlantic: | | | | | | | |
| Coal | 16,781 | 21,555 | 25,374 | 22,170 | 21,954 | 25,881 | 28,654 |
| Oil | 4,001 | 743 | 1,130 | 2,178 | 7,042 | 6,380 | 7,214 |
| Gas | 461 | 32 | 40 | 851 | 783 | 881 | 326 |
| East North Central: | | | | | | | |
| Coal | 20,015 | 25,288 | 30,160 | 30,940 | 30,086 | 36,325 | 40,153 |
| Oil | 425 | 541 | 565 | 700 | 1,419 | 1,262 | 1,704 |
| Gas | 12,911 | 13,108 | 6,935 | 5,959 | 5,318 | 5,118 | 17,373 |
| West North Central: | | | | | | | |
| Coal | 3,620 | 4,015 | 4,888 | 5,009 | 5,027 | 6,379 | 6,813 |
| Oil | 1,399 | 1,527 | 2,035 | 2,168 | 2,569 | 4,198 | 4,034 |
| Gas | 43,152 | 49,994 | 49,053 | 59,699 | 67,420 | 67,974 | 85,371 |
| South Atlantic: | | | | | | | |
| Coal | 6,462 | 8,557 | 9,683 | 9,173 | 8,657 | 11,291 | 12,487 |
| Oil | 4,014 | 4,458 | 5,371 | 6,760 | 7,020 | 8,143 | 9,224 |
| Gas | 4,817 | 12,350 | 12,787 | 17,951 | 15,934 | 15,938 | 17,947 |
| East South Central: | | | | | | | |
| Coal | 1,895 | 3,082 | 3,319 | 2,316 | 1,452 | 3,463 | 4,656 |
| Oil | 161 | 108 | 100 | 126 | 67 | 94 | 112 |
| Gas | 6,392 | 8,739 | 10,102 | 14,261 | 12,303 | 18,206 | 20,599 |
| West South Central: | | | | | | | |
| Coal | 709 | 460 | 412 | 345 | 233 | 271 | 201 |
| Oil | 748 | 770 | 1,125 | 1,113 | 1,029 | 1,314 | 1,451 |
| Gas | 91,651 | 132,040 | 178,949 | 176,686 | 169,731 | 206,923 | 243,509 |
| Mountain: | | | | | | | |
| Coal | 911 | 985 | 942 | 672 | 754 | 1,010 | 1,008 |
| Oil | 940 | 418 | 457 | 510 | 786 | 1,506 | 778 |
| Gas | 9,806 | 10,409 | 11,679 | 15,709 | 16,875 | 18,096 | 31,794 |
| Pacific: | | | | | | | |
| Coal | 1 | 16 | 22 | 1 | 5 | 4 | 11 |
| Oil | 785 | 3,912 | 5,724 | 3,902 | 10,907 | 16,795 | 12,688 |
| Gas | 13,967 | 12,062 | 36,048 | 35,097 | 18,578 | 39,918 | 61,178 |

[1] Breakdowns by regions not available for years 1941 and 1944.

Source: Federal Power Commission.

FIGURE C–2.—CONSUMPTION OF FUEL BY ELECTRIC UTILITY POWER PLANTS FOR PRODUCTION OF ELECTRIC ENERGY.




Source: Federal Power Commission.

TABLE C–4.—*Consumption of fuel by electric utilities in New England and the Middle Atlantic States for production of electric energy during comparable periods in 1948, 1949, and 1950*

[Coal in short tons; oil in 42-gallon barrels; gas in thousands of cubic feet]

| | New England | | | Middle Atlantic | | |
|---|---|---|---|---|---|---|
| | Coal | Oil | Gas | Coal | Oil | Gas |
| Year 1948 | 5,604,087 | 5,440,343 | 0 | 28,653,766 | 7,214,428 | 325,848 |
| Year 1949 | 3,039,083 | 13,667,606 | 0 | 23,167,534 | 18,874,688 | 2,906,690 |
| Percent change | −46 | +151 | 0 | −19 | +162 | +792 |
| January: | | | | | | |
| 1950 | 180,948 | 1,510,482 | 0 | 1,801,059 | 2,426,603 | 6,138 |
| 1949 | 414,271 | 402,586 | 0 | 2,367,627 | 634,463 | 7,974 |
| Percent change | −56 | +275 | 0 | −24 | +282 | −23 |
| February: | | | | | | |
| 1950 | 163,516 | 1,475,806 | 0 | 1,543,626 | 2,890,794 | 6,504 |
| 1949 | 324,803 | 534,391 | 0 | 2,009,945 | 676,017 | 21,961 |
| Percent change | −50 | +176 | 0 | −23 | +328 | −70 |
| March: | | | | | | |
| 1950 | 162,613 | 1,588,915 | 0 | 1,710,348 | 3,288,482 | 5,745 |
| 1949 | 289,510 | 673,051 | 0 | 2,059,943 | 1,131,870 | 29,515 |
| Percent change | −44 | +136 | 0 | −17 | +191 | −81 |
| April: | | | | | | |
| 1950 | 133,090 | 1,282,233 | 0 | 1,643,729 | 2,430,035 | 21,487 |
| 1949 | 210,055 | 709,643 | 0 | 1,853,994 | 1,042,110 | 69,447 |
| Percent change | −37 | +81 | 0 | −11 | +133 | −69 |
| May: | | | | | | |
| 1950 | 153,119 | 1,354,783 | 0 | 1,753,527 | 2,352,180 | 249,161 |
| 1949 | 224,754 | 798,541 | 0 | 1,829,105 | 1,208,786 | 201,941 |
| Percent change | −32 | +70 | 0 | −4 | +95 | +23 |
| June: | | | | | | |
| 1950 | 196,599 | 1,405,057 | 0 | 1,895,745 | 2,147,111 | 360,955 |
| 1949 | 234,153 | 1,129,763 | 0 | 1,826,990 | 1,777,002 | 145,811 |
| Percent change | −16 | +24 | 0 | +4 | +21 | +148 |
| July: | | | | | | |
| 1950 | 176,453 | 1,614,565 | 0 | 1,948,261 | 2,013,304 | 358,884 |
| 1949 | 218,132 | 1,324,402 | 0 | 1,837,680 | 1,659,879 | 43,032 |
| Percent change | −19 | +22 | 0 | +6 | +21 | +734 |
| August: | | | | | | |
| 1950 | 259,158 | 1,754,446 | 0 | 2,288,962 | 1,958,096 | 264,041 |
| 1949 | 267,305 | 1,506,019 | 0 | 2,071,592 | 1,594,411 | 168,369 |
| Percent change | −3 | +16 | 0 | +10 | +23 | +57 |

Source: Federal Power Commission.

TABLE C–5.—*Changes in the use of coal, oil, and natural gas at electric public utility plants in New England and the Middle Atlantic States having coal and other fuel burning facilities during 1948 and 1949*

[Based on percent of power generated by the respective fuels [1]]

| Year | State and region | Number of plants | Coal and coke | Oil | Gas |
|---|---|---|---|---|---|
| | New England: | | | | |
| 1948 | Maine | 3 | 85 | 15 | |
| 1949 | do | 3 | 28 | 72 | |
| 1948 | New Hampshire | 2 | 99 | 1 | |
| 1949 | do | 2 | 31 | 69 | |
| 1948 | Vermont | 2 | 0 | [2] 97 | |
| 1949 | do | 2 | 0 | [2] 95 | |
| 1948 | Massachusetts | 21 | 97 | 3 | |
| 1949 | do | 22 | 45 | 54 | |
| 1948 | Rhode Island | 4 | 52 | 48 | |
| 1949 | do | 4 | 49 | 51 | |
| 1948 | Connecticut | 8 | 82 | 18 | |
| 1949 | do | 8 | 51 | 49 | |
| 1948 | Total New England | 40 | 85 | 15 | |
| 1949 | do | 41 | 47 | 53 | |
| | Middle Atlantic: | | | | |
| 1948 | New York | 15 | 90 | 10 | (1) |
| 1949 | do | 15 | 80 | 20 | (1) |
| 1948 | New Jersey | 11 | 87 | 13 | |
| 1949 | do | 11 | 57 | 40 | 3 |
| 1948 | Pennsylvania | 17 | 98 | 2 | |
| 1949 | do | 17 | 75 | 25 | |
| 1948 | Total Middle Atlantic | 43 | 91 | 9 | (1) |
| 1949 | do | 43 | 72 | 27 | 1 |

[1] Less than ½ of 1 percent.
[2] Balance contributed by wood.

Source: Federal Power Commission.

In the Minerals Yearbook the Bureau of Mines has made a special study of the anthracite market and the inroads into it by competitive fuels. The long-range data indicate that in this century the peak period of anthracite consumption occurred during the decade 1910–20, especially during World War I.

Apparent consumption of anthracite in the United States in 1948 totaled 50.2 million tons, an increase of 4 percent over 1947 (New England had a fuel oil shortage). Apparent consumption is calculated on the basis of production, plus imports, minus exports, and changes in producers' stocks, but no attempt is made to reflect changes in retail dealers' stocks, as data for this group are incomplete. In the absence of complete data on dealers' stocks, it is obviously impossible to measure actual consumption; however, in view of the extremely mild weather prevailing throughout the winter of 1948–49, it might be concluded that actual consumption was lower than apparent consumption. Consumption by class I railroads in 1948 totaled 905,063 tons, a decline of 4 percent from 1947; electric power utilities consumed 3,965,965 tons, an increase of almost 13 percent. Anthracite used in the manufacture of fuel briquets and packaged fuel increased to 1,151,752 tons in 1948, a gain of 8 percent over 1947.

*Competitive fuels in the United States and principal markets*

Of the total shipments of anthracite to points in the United States in 1948, about 96 percent was destined to the New England and Middle Atlantic States, Maryland, Delaware, and the District of Columbia. Data on the consumption of all fuels in this market are not available;

however, apparent consumption of anthracite, domestic coke, briquets, and heating and range oils, in terms of anthracite, totaled 95,927,000 net tons in 1948, an increase of 5 percent over 1947. All of the gain was the result of increased consumption of heating and range oils. Fuel oil surpassed anthracite consumption in this area for the first time in 1947 on an equivalent B. t. u. or heating-value basis and, in 1948, accounted for 52 percent of the total consumption of the fuels indicated in table 25.

As indicated in table C–6, supplies of various fuels generally used for space-heating purposes in the United States in 1948 increased over 1947, a substantial gain being indicated in sales of heating and range oils.

TABLE C–6.—*Apparent consumption of anthracite and selected competitive fuels in the principal anthracite markets, 1945–48*

[Thousands of net tons]

| Fuel | New England | New York | New Jersey | Pennsylvania | Delaware | Maryland | District of Columbia | Total | Percent of total fuels |
|---|---|---|---|---|---|---|---|---|---|
| Anthracite: | | | | | | | | | |
| All users: [1] | | | | | | | | | |
| 1945 | 4,867 | [2] 14,488 | [2] 8,666 | 15,776 | 343 | 868 | 270 | 45,278 | 56.5 |
| 1946 | 5,367 | [2] 16,103 | [2] 8,663 | 17,525 | 322 | 980 | 281 | 49,241 | 56.0 |
| 1947 | 4,457 | [2] 14,924 | [2] 7,177 | 16,127 | 316 | 895 | 228 | 44,124 | 48.3 |
| 1948 | 4,600 | [2] 15,004 | [2] 6,806 | 16,116 | 313 | 709 | 215 | 43,763 | 45.6 |
| Imports: [3] | | | | | | | | | |
| 1945 | | | | | | | | (4) | (5) |
| 1946 | | | | | | | | | |
| 1947 | | 7 | | | | | | 7 | (5) |
| 1948 | | | | | | 1 | | 1 | (5) |
| Briquets: | | | | | | | | | |
| Domestic use: | | | | | | | | | |
| 1945 | 83 | 67 | 16 | 52 | 3 | 10 | 2 | 233 | .3 |
| 1946 | 121 | 94 | 28 | 50 | 4 | 21 | 2 | 320 | .4 |
| 1947 | 49 | 49 | 32 | 126 | 1 | 29 | 2 | 288 | .3 |
| 1948 | 59 | 44 | 26 | 88 | 1 | 24 | 3 | 245 | .3 |
| Imports: [3] | | | | | | | | | |
| 1945 | | | | | | | | (4) | (5) |
| 1946 | | | | | | | | (4) | (5) |
| 1947 | | | | | | | | (4) | (5) |
| 1948 | | | | | | | | | |
| Coke: | | | | | | | | | |
| Domestic use: | | | | | | | | | |
| 1945 | 1,371 | 1,375 | 552 | 334 | 5 | 2 | 2 | 3,641 | 4.6 |
| 1946 | 1,085 | 987 | 469 | 291 | 3 | 5 | (4) | 2,840 | 3.2 |
| 1947 | 834 | 693 | 407 | 220 | (4) | 1 | | 2,155 | 2.4 |
| 1948 | 778 | 689 | 386 | 242 | 1 | (4) | | 2,096 | 2.2 |
| Imports: [3] | | | | | | | | | |
| 1945 | 1 | 19 | | | | | | 20 | (5) |
| 1946 | (4) | 11 | | | | | | 11 | (5) |
| 1947 | 1 | | | | | | | 1 | (5) |
| 1948 | 1 | 38 | | | | | | 39 | (5) |
| Oil: Heating and range: [6] | | | | | | | | | |
| 1945 | 11,205 | 10,095 | 5,037 | 2,728 | 154 | 1,136 | 584 | 30,939 | 38.6 |
| 1946 | 12,924 | 11,554 | 5,713 | 3,175 | 184 | 1,327 | 665 | 35,542 | 40.4 |
| 1947 | 16,855 | 12,940 | 7,153 | 4,880 | 257 | 1,929 | 793 | 44,807 | 49.0 |
| 1948 | 18,652 | 14,390 | 8,224 | 5,207 | 278 | 2,256 | 776 | 49,783 | 51.9 |
| Total fuel: [7] | | | | | | | | | |
| 1945 | 17,527 | 26,044 | 14,271 | 18,890 | 505 | 2,016 | 858 | 80,111 | 100.0 |
| 1946 | 19,497 | 28,749 | 14,873 | 21,041 | 513 | 2,333 | 948 | 87,954 | 100.0 |
| 1947 | 22,196 | 28,613 | 14,769 | 21,353 | 574 | 2,854 | 1,023 | 91,382 | 100.0 |
| 1948 | 24,090 | 30,165 | 15,442 | 21,653 | 593 | 2,990 | 994 | 95,927 | 100.0 |

[1] Pennsylvania Department of Mines; illicit coal not included.
[2] An important but undetermined part of anthracite shown as shipped to New Jersey is reshipped to New York City.
[3] U. S. Department of Commerce.
[4] Less than 1,000 tons.
[5] Less than 0.05 percent.
[6] Converted to coal equivalent upon basis of 4 barrels of fuel oil equaling 1 ton of coal.
[7] Excludes bituminous coal.

Source: U. S. Bureau of Mines.

TABLE C–7.—*Total supplies of fuels commonly used for space-heating purposes in the United States, 1937 and 1945–48*

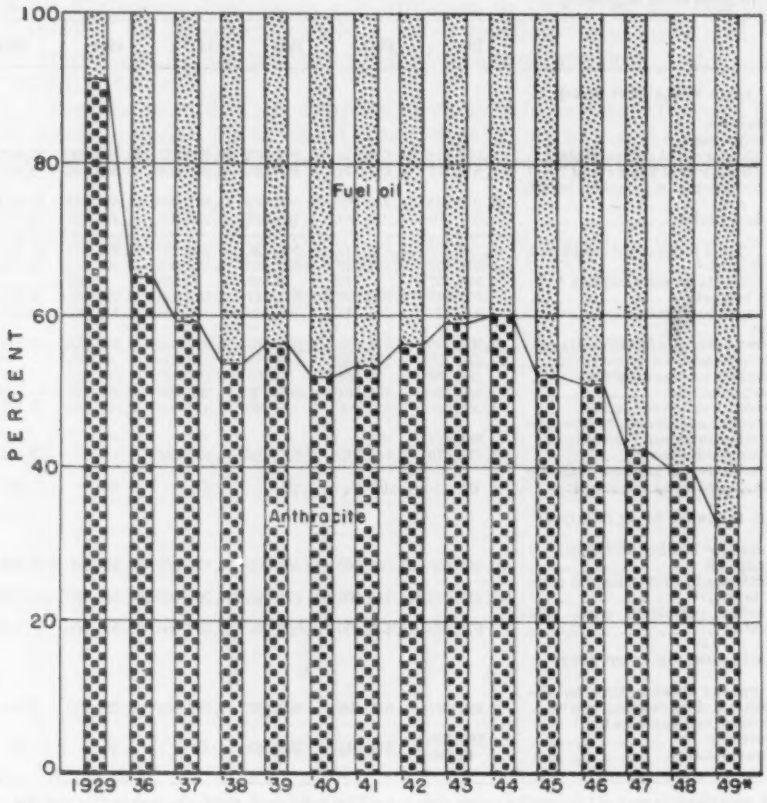
[Where available, figures represent quantity actually consumed for domestic heating or for space-heating offices, apartments, hotels, schools, hospitals, etc. Where such figures are not available but where the fuel is known to be used chiefly for domestic or space-heating purposes, total production (or imports) is shown to indicate trend of growth]

| | 1937 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|
| SOLID FUELS (NET TONS) | | | | | | |
| Anthracite: | | | | | | |
| Production: | | | | | | |
| Shipments of domestic sizes | 29,092,974 | 28,610,174 | 31,067,802 | 29,210,251 | 29,509,890 | 21,697,606 |
| Shipments of Buckwheat No. 1 | 6,859,707 | 6,681,171 | 7,181,843 | 6,557,076 | 6,409,788 | 4,919,029 |
| Shipments of smaller steam sizes [1] | 10,250,463 | 13,251,106 | 15,318,942 | 15,285,086 | 14,563,514 | 11,062,861 |
| Local sales | 2,981,391 | 4,273,864 | 4,435,536 | 4,232,871 | 4,795,721 | 3,848,420 |
| Total commercial production | 49,184,535 | 52,816,315 | 58,544,123 | 55,285,284 | 55,278,913 | 41,537,916 |
| Export [2] | 1,914,173 | 3,691,247 | 6,497,245 | 8,509,995 | 6,675,914 | 4,942,670 |
| Imports for consumption [2] | 395,737 | 149 | 9,556 | 10,350 | 945 | |
| Fuel briquets [3] | 977,254 | 2,588,819 | 2,841,341 | 2,923,223 | 2,930,921 | 2,237,196 |
| Packaged-fuel production | 146,037 | 208,143 | 190,919 | 182,881 | 157,013 | 125,948 |
| Coke: | | | | | | |
| Oven-coke sales for domestic use | 7,807,792 | 6,574,526 | 4,947,085 | 3,917,402 | 3,398,696 | 2,740,987 |
| Beehive sales for domestic use | 299,726 | 200,982 | 149,648 | 59,926 | 46,613 | 14,853 |
| Imports for consumption [2] | 286,364 | 51,964 | 52,188 | 104,093 | 161,400 | 277,507 |
| Retort-coke sales | [4] 350,700 | 431,361 | 355,336 | 282,666 | 199,123 | 140,236 |
| Petroleum-coke production | 1,306,600 | 2,023,000 | 2,124,200 | 2,415,400 | 2,898,800 | 3,391,800 |
| Anthracite and semianthracite production outside of Pennsylvania | 468,852 | [5] | [5] | [5] | [5] | [5] |
| Lignite production [6] | 3,218,419 | 2,668,310 | 2,667,619 | 2,873,653 | [7] | 3,092,130 |
| Bituminous-coal sales for domestic use | [5] | [5] | [5] | [5] | [5] | [5] |
| OIL (BARRELS OF 42 GALLONS) | | | | | | |
| Oil sales for heating buildings: | | | | | | |
| Range oil | 32,259,000 | 51,021,000 | 60,564,000 | 74,114,000 | 84,163,000 | [12] 78,529,000 |
| Heating oils (domestic and commercial) [8] | 116,617,000 | 165,216,000 | 189,371,000 | 234,761,000 | 258,663,000 | 254,902,000 |
| Liquefied petroleum gases (domestic) | 972,000 | 12,697,000 | 18,059,000 | 27,394,000 | 35,078,000 | 38,751,000 |
| GAS (MILLION CUBIC FEET) | | | | | | |
| Natural-gas consumption for domestic and commercial use [10] | 489,234 | 837,499 | 902,622 | 1,087,363 | [9] 1,232,770 | 1,366,000 |
| Manufactured-gas sales for: [11] | | | | | | |
| Domestic use | 193,325 | 311,043 | 335,369 | [7] | [7] | [7] |
| House heating | 45,200 | | | | | |

[1] A considerable part of the smaller steam sizes is used by industries, railroads, and public utilities.
[2] U. S. Department of Commerce.
[3] Production plus imports less exports.
[4] Partly estimated.
[5] Data not available.
[6] An estimated one-half of total production shown is used for domestic purposes.
[7] Data not yet available.
[8] Exact data not available.
[9] Includes all grades of fuel oil used for heating buildings.
[10] Includes gas used for heating offices, hotels, apartments, hospitals, stores, and other large buildings, as well as houses.
[11] American Gas Association.
[12] Estimated.

Source: U. S. Bureau of Mines.

FIGURE C–3.—COMPARATIVE CONSUMPTION IN PERCENT OF TOTAL OF ANTHRACITE AND FUEL OIL USED FOR SPACE-HEATING PURPOSES IN THE PRIMARY ANTHRACITE MARKET AREA, 1929 AND 1936–49. (INCLUDES NEW ENGLAND AND MIDDLE ATLANTIC STATES, DELAWARE, MARYLAND, AND THE DISTRICT OF COLUMBIA.)




Source: Bureau of Mines.

It is interesting to note in this connection, that in the anthracite market a smaller proportion of residential customers employ gas (other than mixed) for space heating and central heating, than in any other region.

TABLE C–8.—*Residential customers using gas for central and space heating, by type of gas—number and percent, by census division, 1949*

[Yearly averages in thousands]

| Census division | Total | | Natural gas | | Manufactured gas | | Mixed gas | |
|---|---|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| United States | 7,442.9 | 35.5 | 6,844.0 | 60.0 | 389.6 | 4.9 | 209.3 | 12.6 |
| New England | 62.1 | 4.1 | (1) | (1) | 62.1 | 4.1 | (1) | (1) |
| Middle Atlantic | 600.4 | 10.0 | 300.9 | 29.4 | 215.3 | 4.5 | 84.2 | 34.3 |
| East North Central | 970.4 | 20.0 | 873.5 | 27.8 | 24.2 | 4.1 | 72.7 | 6.5 |
| West North Central | 587.7 | 37.2 | 559.1 | 43.5 | 4.2 | 4.3 | 24.4 | 12.4 |
| South Atlantic | 403.2 | 28.9 | 360.6 | 52.7 | 42.6 | 6.0 | (1) | (1) |
| East South Central | 343.1 | 56.5 | 300.2 | 64.3 | 14.9 | 32.6 | 28.0 | 29.7 |
| West South Central | 1,894.2 | 97.2 | 1,894.2 | 97.2 | (1) | (1) | (1) | (1) |
| Mountain | 380.3 | 81.6 | 380.3 | 81.8 | (2) | (2) | (1) | (1) |
| Pacific | 2,201.5 | 86.8 | 2,175.2 | 90.9 | 26.3 | 18.1 | (1) | (1) |

[1] No gas of this type distributed in these divisions.
[2] Less than 100 customers.

Source: American Gas Association Gas Facts, 1949.

Railroads, another large-scale fuel consumer, increased their receipts of all fuels except gasoline during the war years. But their consumption of all fuels except diesel oil fell off sharply at the end of the war. Over the 10-year period, 1938–48, receipts of diesel oil multiplied more than twentyfold. Coal consumption rose by one-third, fuel-oil consumption by one-half; gasoline use remained at the same level all through the period with only minor fluctuations. That the price of diesel oil itself was not the dominant factor in promoting its use is indicated by the similar increase in unit costs of other fuels. All of them a little more than doubled during the period, except gasoline, which rose slightly less.

TABLE C–9.—*Steam railways (class I line-haul railways)—Fuel received and unit cost: Bituminous coal, fuel oil, Diesel oil, and gasoline, 1938–48*

| Year ended Dec. 31— | Bituminous coal | | Fuel oil | | Diesel oil | | Gasoline | |
|---|---|---|---|---|---|---|---|---|
| | Quantity | Cost per ton [1] | Quantity | Cost per gallon | Quantity | Cost per gallon [1] | Quantity | Cost per gallon |
| | *Thousand net tons* | | *Million gallons* | *Cents* | *Million gallons* | *Cents* | *Million gallons* | *Cents* |
| 1938 | 74,784 | $2.36 | 2,426 | 2.214 | (1) | (1) | 46.3 | 8.034 |
| 1939 | 81,813 | 2.37 | 2,573 | 2.012 | 43.9 | 4.395 | 45.7 | 7.972 |
| 1940 | 88,595 | 2.32 | 2,752 | 2.020 | 72.9 | 4.480 | 46.3 | 8.109 |
| 1941 | 104,100 | 2.48 | 3,368 | 2.151 | 114.1 | 4.516 | 47.1 | 9.115 |
| 1942 | 120,910 | 2.50 | 4,135 | 2.213 | 174.4 | 5.049 | 46.5 | 10.135 |
| 1943 | 129,738 | 2.94 | 4,802 | 2.635 | 218.8 | 5.270 | 44.9 | 10.736 |
| 1944 | 135,579 | 3.13 | 4,744 | 2.632 | 315.8 | 5.353 | 45.8 | 11.061 |
| 1945 | 123,007 | 3.25 | 4,706 | 2.612 | 441.5 | 5.213 | 46.1 | 10.913 |
| 1946 | 108,148 | 3.58 | 4,144 | 2.961 | 543.8 | 5.521 | 44.6 | 10.828 |
| 1947 | 109,884 | 4.13 | 4,052 | 3.960 | 748.8 | 7.435 | 45.1 | 13.002 |
| 1948 | 98,826 | 4.89 | 3,759 | 5.545 | 1,170.4 | 10.223 | 46.8 | 15.886 |

[1] Not available.

Source: ICC, Statistics of Railways in the United States, 1948, p. 68.

Another look at the distribution pattern of natural gas, this time from the point of view of the consuming State, again shows that 30 States depend on the State of Texas to help heat their homes. Since the year 1948, a number of additional States have become recipients of Texas natural gas. But even in that year of the 34 States (including the District of Columbia) which consumed any natural gas, all but three (including District of Columbia) received some of it from Texas. Next in rank as sources of this fuel came Oklahoma, Louisiana, and Kansas.

TABLE C–10.—*Interstate transmission of natural gas by State of destination, with State of origin, 1948*

[Millions of cubic feet]

| State of destination | State of origin | Gas transported |
|---|---|---|
| United States | | 1,737,925 |
| Alabama | Total | 61,685 |
| | Louisiana | 31,376 |
| | Mississippi | 15,504 |
| | Texas | 14,805 |
| Arizona | Total | 37,227 |
| | New Mexico | 29,260 |
| | Texas | 7,967 |
| Arkansas | Total | 62,679 |
| | Louisiana | 49,640 |
| | Texas | 8,439 |
| | Oklahoma | 4,600 |
| California | Total | 65,560 |
| | New Mexico | 51,516 |
| | Texas | 14,044 |
| Colorado | Total | 60,618 |
| | Texas | 40,024 |
| | Kansas | 19,995 |
| | New Mexico | 599 |
| District of Columbia | Total | 9,808 |
| | Kentucky | 6,500 |
| | West Virginia | 3,308 |
| Florida | Total | 8,946 |
| | Louisiana | 5,292 |
| | Mississippi | 2,423 |
| | Texas | 1,231 |
| Georgia | Total | 47,781 |
| | Louisiana | 21,975 |
| | Texas | 14,268 |
| | Mississippi | 11,538 |
| Illinois | Total | 160,758 |
| | Texas | 115,668 |
| | Louisiana | 26,781 |
| | Oklahoma | 9,245 |
| | Kansas | 9,008 |
| | Kentucky | 34 |
| | Indiana | 22 |
| Indiana | Total | 52,873 |
| | Texas | 26,864 |
| | Kansas | 11,641 |
| | Oklahoma | 10,384 |
| | Louisiana | 3,147 |
| | Kentucky | 837 |
| United States—Continued | | |
| Iowa | Total | 53,368 |
| | Texas | 29,068 |
| | Kansas | 23,221 |
| | Oklahoma | 1,079 |
| Kansas | Total | 155,000 |
| | Oklahoma | 101,227 |
| | Texas | 53,773 |
| Kentucky | Total | 25,351 |
| | Texas | 23,296 |
| | Louisiana | 2,055 |
| Louisiana | Total | 35,260 |
| | Texas | 28,021 |
| | Mississippi | 7,239 |
| Maryland | Total | 4,513 |
| | Kentucky | 1,709 |
| | West Virginia | 1,519 |
| | Pennsylvania | 631 |
| | Texas | 614 |
| | Louisiana | 40 |
| Michigan | Total | 71,964 |
| | Kansas | 30,854 |
| | Oklahoma | 21,280 |
| | Texas | 19,830 |
| Minnesota | Total | 53,443 |
| | Kansas | 32,012 |
| | Texas | 20,469 |
| | Oklahoma | 962 |
| Mississippi | Total | 42,050 |
| | Louisiana | 31,243 |
| | Texas | 10,807 |
| Missouri | Total | 93,084 |
| | Oklahoma | 34,809 |
| | Louisiana | 33,338 |
| | Texas | 14,590 |
| | Kansas | 10,347 |
| Montana | Wyoming | 3,881 |
| Nebraska | Total | 51,064 |
| | Kansas | 32,854 |
| | Texas | 14,051 |
| | Wyoming | 2,493 |
| | Oklahoma | 1,666 |
| New Mexico | Texas | 8,165 |

TABLE C–10.—*Interstate transmission of natural gas by State of destination, with State of origin, 1948*—Continued

[Millions of cubic feet]

| State of destination | State of origin | Gas transported |
|---|---|---|
| United States—Continued | | |
| New York | Total | 45,767 |
| | Pennsylvania | 16,246 |
| | Texas | 15,232 |
| | West Virginia | 7,881 |
| | Louisiana | 6,348 |
| | Kentucky | 60 |
| North Dakota | Montana | 3,099 |
| Ohio | Total | 201,092 |
| | Texas | 97,346 |
| | West Virginia | 57,616 |
| | Louisiana | 22,747 |
| | Kansas | 10,800 |
| | Oklahoma | 7,501 |
| | Kentucky | 5,082 |
| Oklahoma | Total | 17,752 |
| | Texas | 16,429 |
| | Kansas | 1,323 |
| Pennsylvania | Total | 142,428 |
| | West Virginia | 59,306 |
| | Texas | 51,823 |
| | Kentucky | 16,480 |
| | Louisiana | 14,379 |
| | New York | 440 |
| South Dakota | Total | 8,892 |
| | Kansas | 3,468 |
| | Montana | 2,490 |
| | Texas | 2,216 |
| | North Dakota | 643 |
| | Oklahoma | 75 |
| United States—Continued | | |
| Tennessee | Total | 38,808 |
| | Louisiana | 29,442 |
| | Texas | 9,340 |
| | Virginia | 26 |
| Texas | Total | 40,997 |
| | Louisiana | 16,317 |
| | Oklahoma | 13,336 |
| | New Mexico | 9,058 |
| | Arkansas | 2,286 |
| Utah | Total | 15,387 |
| | Wyoming | 9,336 |
| | Colorado | 6,051 |
| Virginia | Total | 4,045 |
| | West Virginia | 1,768 |
| | Kentucky | 1,149 |
| | Texas | 1,109 |
| | Louisiana | 19 |
| West Virginia | Total | 52,475 |
| | Texas | 39,769 |
| | Kentucky | 10,670 |
| | Pennsylvania | 1,156 |
| | Ohio | 535 |
| | Louisiana | 345 |
| Wisconsin | Total | 429 |
| | Texas | 418 |
| | Oklahoma | 11 |
| Wyoming | Total | 1,676 |
| | Texas | 1,617 |
| | Colorado | 59 |

Source: Compiled from U. S. Bureau of Mines data.

# CHAPTER II

# PRODUCTION, EXPORTS, IMPORTS

## 1. Production

Much the larger part of our fuel and energy supply is produced and consumed domestically. Imports and exports at this time constitute small but not necessarily insignificant parts of the total. And we are, on a national basis, or on a per capita basis, the world's largest producer and consumer of nonhuman energy.

*Coal*

Of a world production of all types of coal, including lignite, of 1,632,000,000 metric tons in 1949 (and substantially more than that during most of the 1940's), the United States produced about one-fourth (table D–1). United States production consisted of 90 percent of a good grade bituminous (391,898,000 metric tons), about 9 percent, anthracite (38,704,000 metric tons), and little less than 1 percent lignite (2,725,000 metric tons) (table D–2). Other coal production, though very widespread geographically, came predominately from the coal fields of the United Kingdom, the Ruhr, Silesia, the Donetz Basin in Russia, Japan, and India. In our own country production originated very largely in the Appalachian and eastern interior fields as shown by table D–3.

TABLE D–1.—*World production of coal and lignite, by countries, 1942–49 in thousands of metric tons* [1]

[Compiled by Berenice B. Mitchell and Pauline Roberts]

| Country [1] | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|---|---|
| North America: | | | | | | | | |
| Canada: | | | | | | | | |
| Coal | [2] 15,932 | [2] 14,689 | 14,201 | 13,584 | 14,776 | 12,971 | 15,296 | 15,640 |
| Lignite | [2] 1,181 | [2] 1,512 | 1,245 | 1,391 | 1,382 | 1,425 | 1,442 | 1,696 |
| Greenland | 5 | 7 | 8 | 7 | 8 | 7 | 8 | (3) |
| Mexico | 914 | 1,025 | 904 | 915 | 977 | 1,055 | 1,057 | [4] 1,028 |
| United States: | | | | | | | | |
| Anthracite (Pennsylvania) | 54,728 | 55,015 | 57,789 | 49,835 | 54,891 | 51,882 | 51,836 | 38,704 |
| Bituminous | 525,948 | 532,903 | 559,750 | 521,582 | 481,943 | 569,482 | 541,072 | 391,898 |
| Lignite | 2,659 | 2,494 | 2,317 | 2,421 | 2,420 | 2,607 | 2,799 | 2,725 |
| South America: | | | | | | | | |
| Argentina [5] | 5 | 8 | 5 | 3 | 3 | 14 | (3) | (3) |
| Brazil: | | | | | | | | |
| Coal | 1,354 | 1,537 | 1,415 | 1,492 | 1,274 | 1,996 | [4] 2,013 | [4] 2,140 |
| Lignite | 17 | 23 | 16 | 9 | (3) | (3) | (3) | (3) |
| Chile | 1,782 | 2,032 | 2,047 | 1,827 | 1,740 | 1,850 | 2,019 | [4] 1,800 |
| Colombia | 578 | 483 | 499 | 534 | 551 | 505 | [4] 900 | (3) |
| Peru | 149 | 187 | 173 | 201 | 230 | 215 | 189 | 200 |
| Venezuela | 9 | 11 | 9 | 7 | 4 | [4] 15 | 21 | (3) |
| Europe: | | | | | | | | |
| Albania: Lignite [4] | 20 | 10 | 5 | 5 | 12 | 20 | (3) | (3) |
| Austria: | | | | | | | | |
| Coal | 225 | 214 | 195 | 72 | 108 | 178 | 181 | 183 |
| Lignite | 3,523 | 3,646 | 3,674 | 2,066 | 2,407 | 2,839 | 3,338 | 3,816 |
| Belgium | 25,055 | 23,737 | 13,529 | 15,833 | 22,852 | 24,390 | 26,679 | 27,859 |
| Bulgaria: | | | | | | | | |
| Coal | 220 | 204 | 125 | 128 | 93 | 120 | (3) | (3) |
| Lignite | 3,448 | 3,812 | 2,890 | 3,435 | 3,420 | 4,011 | [4] 4,250 | (3) |

See footnotes at end of table, p. 72.

TABLE D–1.—*World production of coal and lignite, by countries, 1942–49 in thousands of metric tons* [1]—*Continued*

| Country [1] | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|---|---|
| Europe—Continued | | | | | | | | |
| Czechoslovakia: | | | | | | | | |
| Coal | 22,635 | 24,500 | 23,159 | 11,716 | 14,167 | 16,216 | 17,746 | 17,003 |
| Lignite | 23,316 | 26,750 | 26,112 | 15,356 | 19,475 | 22,362 | 23,589 | 26,526 |
| Denmark: Lignite | 1,800 | 2,600 | 2,200 | 2,320 | 2,300 | 2,800 | 2,347 | 1,428 |
| France: | | | | | | | | |
| Coal | 41,869 | 40,531 | 25,241 | 33,313 | 47,185 | 45,229 | 43,291 | 51,199 |
| Lignite | 1,958 | 1,896 | 1,336 | 1,704 | 2,104 | 2,094 | 1,838 | 1,845 |
| Saar | (3) | (3) | (3) | (3) | 7,887 | 10,485 | 12,567 | 14,262 |
| Germany: | | | | | | | | |
| Coal | 251,970 | 158,616 | 135,336 | [6] 23,610 | 65,667 | 85,771 | 91,246 | [4] 108,000 |
| Lignite | 244,643 | 254,604 | 230,808 | 107,248 | 159,924 | 160,595 | 175,736 | [4] 190,000 |
| Greece: Lignite | 365 | 370 | 190 | 70 | 125 | 133 | 125 | (3) |
| Hungary: | | | | | | | | |
| Coal | 1,250 | 1,376 | [7] [8] 1,050 | [7] 711 | 722 | 1,059 | 1,238 | [4] 1,380 |
| Lignite | 11,720 | 11,296 | [7] [8] 8,400 | [7] 3,574 | 5,630 | 7,750 | 9,360 | [4] 10,436 |
| Ireland | 167 | 186 | 206 | 216 | 216 | 221 | 182 | 115 |
| Italy: | | | | | | | | |
| Coal | 2,512 | 1,358 | 613 | 758 | 1,178 | 1,358 | 975 | 1,104 |
| Lignite | 2,305 | 1,934 | 496 | 767 | 1,521 | 1,851 | 904 | 832 |
| Netherlands: | | | | | | | | |
| Coal | 12,330 | 12,497 | 8,313 | 5,097 | 8,314 | 10,104 | 11,032 | 11,703 |
| Lignite | 281 | 383 | 243 | 130 | 499 | 474 | 279 | [4] 207 |
| Poland: | | | | | | | | |
| Coal | [9] 83,972 | [9] 91,362 | [9] 87,389 | 27,366 | 47,288 | 59,130 | 70,262 | 69,900 |
| Lignite | (3) | (3) | (3) | (3) | 857 | 4,766 | 5,040 | [4] 4,585 |
| Portugal: | | | | | | | | |
| Coal | 498 | 403 | 426 | 436 | 380 | 370 | 387 | 444 |
| Lignite | 108 | 106 | 127 | 163 | 141 | 108 | 103 | 111 |
| Rumania: | | | | | | | | |
| Coal | 285 | 306 | 202 | 211 | 167 | 163 | 2,631 | [4] 191 |
| Lignite | 2,367 | 2,604 | 2,069 | 1,820 | 1,784 | 2,105 | | [4] 2,378 |
| Spain: | | | | | | | | |
| Coal | 9,257 | 9,591 | 10,485 | 10,732 | 10,759 | 10,606 | 10,627 | 10,641 |
| Lignite | 1,106 | 1,112 | 1,202 | 1,351 | 1,336 | 1,263 | 1,400 | 1,321 |
| Svalbard (Spitsbergen) | | | | 6 | 96 | 337 | 437 | [4] 500 |
| Sweden | 582 | 557 | 570 | 615 | 488 | 416 | 374 | 311 |
| Switzerland: | | | | | | | | |
| Coal | 184 | 157 | 71 | 180 | 94 | 15 | | |
| Lignite | 27 | 75 | 74 | 130 | 81 | 12 | | |
| U. S. S. R.: | | | | | | | | |
| Coal | [4] 90,000 | [4] 131,400 | [4] 118,000 (3) | [4] 146,000 (3) | [4] 161,000 | [4] 175,000 | [4] 201,000 | [4] 226,000 |
| Lignite | | | | | | | | |
| United Kingdom: | | | | | | | | |
| Great Britain [10] | 208,234 | 202,113 | 195,840 | 185,707 | 193,117 | 200,615 | 211,772 | 217,161 |
| Northern Ireland: | | | | | | | | |
| Coal | (11) | (11) | (11) | (11) | (11) | 1 | 1 | (3) |
| Lignite | 1 | 1 | 2 | 3 | (11) | (11) | (11) | (3) |
| Yugoslavia: | | | | | | | | |
| Coal | [12] [13] 1,160 | 1,390 | (3) | 206 | 757 | 1,062 | 11,500 | [4] 12,900 |
| Lignite | | | | 3,405 | 6,047 | 8,229 | | |
| Asia: | | | | | | | | |
| Afghanistan | 5 | | | 12 | 5 | 5 | [10] 15 | (3) |
| China: | | | | | | | | |
| Coal | [4] 65,267 | 462,713 | [1] 62,465 | 16,576 | 11,475 | 14,148 | [4] 8,720 | [4] 16,000 |
| Lignite | 419 | | | (3) | (3) | (3) | (3) | (3) |
| Formosa | 2,311 | 2,324 | 1,653 | 795 | 1,058 | 1,289 | [4] 1,500 | 1,649 |
| French Indochina: | | | | | | | | |
| Coal | 1,218 | 996 | 533 | 231 | 262 | 248 | 359 | 385 |
| Lignite | 24 | 25 | 4 | | | | | |
| India | 29,906 | 25,921 | 26,546 | 29,635 | 30,186 | 28,862 | 30,303 | [4] 31,760 |
| Indonesia | 872 | 1,038 | 753 | 308 | 157 | 299 | [14] 537 | [4] 590 |
| Iran [15] | 82 | 69 | 100 | [4] 150 | [4] 150 | 188 | (3) | (3) |
| Japan: | | | | | | | | |
| Coal | [16] 54,179 | [16] 55,539 | [16] 49,335 | [16] 22,371 | 20,376 | 27,235 | 33,725 | 37,969 |
| Lignite | [16] 1,607 | [16] 2,876 | [16] 2,304 | [16] 1,643 | 2,352 | 2,820 | 2,552 | [4] 2,095 |
| Karafuto | [4] 7,000 | 7,500 | 8,000 | (3) | (3) | (3) | (3) | (3) |
| Korea: | | | | | | | | |
| North Korea: | | | | | | | | |
| Coal | 2,692 | 2,939 | 3,132 | 34 | [4] 821 | [4] 1,352 | (3) | (3) |
| Lignite | 2,927 | 2,386 | 2,492 | 1 | [4] 432 | [4] 1,616 | (3) | (3) |
| South Korea: | | | | | | | | |
| Coal | 1,206 | 1,218 | 1,398 | 640 | 251 | 463 | 799 | 1,066 |
| Lignite | 31 | 44 | 27 | 17 | 26 | 37 | 68 | 60 |

See footnotes at end of table, p. 72.

TABLE D–1.—*World production of coal and lignite, by countries, 1942–49 in thousands of metric tons* [1]—Continued

| Country [1] | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|---|---|
| Asia—Continued | | | | | | | | |
| Malaya | 249 | 497 | 416 | 230 | 228 | 230 | 381 | 393 |
| Pakistan | (17) | (17) | (17) | (17) | (17) | 340 | 250 | [4] 325 |
| Philippines | (3) | (3) | (3) | (3) | 48 | 74 | 88 | 123 |
| Syria and Lebanon: Lignite | 7 | 1 | 2 | 2 | (11) | ---------- | (11) | (3) |
| Turkey: | | | | | | | | |
| Coal | 2,510 | 2,071 | 2,383 | 2,150 | 2,312 | 2,623 | 2,669 | 2,705 |
| Lignite | 409 | 414 | 533 | 571 | 484 | 628 | 829 | [4] 927 |
| U. S. S. R.: | | | | | | | | |
| Coal | (18) | (18) | (18) | (18) | (18) | (18) | (18) | (18) |
| Lignite | | | | | | | | |
| Africa: | | | | | | | | |
| Algeria: | | | | | | | | |
| Coal | 148 | 117 | 120 | 162 | 215 | 205 | 226 | 257 |
| Lignite | 7 | 1 | 1 | (3) | (3) | (3) | (3) | (3) |
| Belgian Congo | 43 | 70 | 49 | 50 | 102 | 102 | 117 | (3) |
| French Morocco | 119 | 102 | 134 | 179 | 222 | 268 | 290 | 347 |
| Madagascar | 2 | 1 | 2 | 3 | (11) | ---------- | (3) | (3) |
| Mozambique | 7 | 13 | 16 | 12 | 16 | 16 | 16 | (3) |
| Nigeria | [16] 471 | [16] 537 | 651 | 679 | 648 | 591 | [20] 618 | [20] 559 |
| Southern Rhodesia | 1,561 | 1,779 | 1,808 | 1,669 | 1,613 | 1,508 | 1,695 | 1,918 |
| Tunisia: Lignite | 141 | 41 | 66 | 69 | 95 | 76 | 71 | [4] 47 |
| Union of South Africa | 20,408 | 20,561 | 22,987 | 23,554 | 23,601 | 23,818 | 24,017 | [21] 25,010 |
| Oceania: | | | | | | | | |
| Australia: | | | | | | | | |
| New South Wales | 12,433 | 11,714 | 11,280 | 10,402 | 11,397 | 11,806 | 11,909 | 10,910 |
| Queensland | 1,663 | 1,727 | 1,686 | 1,661 | 1,593 | 1,914 | 1,770 | [22] 1,352 |
| South Australia | 2 | ---------- | 35 | 42 | 138 | 196 | 243 | [22] 280 |
| Tasmania | 137 | 148 | 146 | 151 | 161 | 170 | 182 | [22] 126 |
| Victoria: | | | | | | | | |
| Coal | 318 | 292 | 262 | 251 | 194 | 176 | 170 | [23] 84 |
| Lignite | 5,013 | 5,173 | 5,097 | 5,533 | 5,799 | 6,239 | 6,800 | [22] 5,713 |
| Western Australia | 591 | 540 | 567 | 552 | 653 | 742 | 745 | 764 |
| New Zealand: | | | | | | | | |
| Coal | 1,194 | 1,157 | 1,085 | 980 | 974 | 951 | 968 | 937 |
| Lignite | 1,529 | 1,676 | 1,766 | 1,899 | 1,865 | 1,845 | 1,853 | 1,874 |
| Total, all grades | 1,874,000 | 1,838,000 | 1,765,000 | 1,338,000 | 1,477,000 | 1,649,000 | 1,706,000 | 1,632,000 |
| Lignite (total of items shown above) | 313,000 | 328,000 | 309,000 | 168,000 | 222,000 | 238,000 | 246,000 | 263,000 |
| Bituminous coal and anthracite (by subtraction) | 1,561,000 | 1,510,000 | 1,456,000 | 1,170,000 | 1,255,000 | 1,411,000 | 1,460,000 | 1,369,000 |

[1] Coal is also mined in British Borneo, Faroe Islands, and Italian East Africa (formerly), but production figures are not available and no estimate is included in the total.
[2] A change from previous years has been made in the classification adopted by the American Society for Testing Materials. (Alberta is the only Province affected.)
[3] Data not available; estimate included in total.
[4] Estimate.
[5] In addition, the following quantities (metric tons) of asphaltite were produced and used as solid fuels: 1942, 56,387; 1943, 105,625; 1944, 106,300; 1945, 135,300; 1946, 83,800; 1947, 80,900; 1948 and 1949, data not available.
[6] July to December, inclusive.
[7] Data represent Trianon Hungary subsequent to October 1944.
[8] January to October, inclusive.
[9] Includes that part of Germany which is under Polish administration (east of the Oder and Neisse Rivers).
[10] Includes open-cast coal as follows, in thousands of tons: 1942, 1,332; 1943, 4,498; 1944, 8,787; 1945, 8,246; 1946, 8,965; 1947, 10,407; 1948, 11,916; 1949, 12,599.
[11] Production less than 1,000 tons.
[12] Estimated production of Croatia.
[13] January to June, inclusive.
[14] Excludes production of Ombilin mines in Sumatra.
[15] Fiscal year ended Mar. 20 of year following that stated.
[16] Fiscal year ended Mar. 31 of year following that stated.
[17] Included under India.
[18] Output from U. S. S. R. in Asia included with U. S. R. R. in Europe.
[19] Planned production.
[20] Including British Cameroons.
[21] Local sales and exports.
[22] January to September, inclusive.

TABLE D–2.—*Growth of the bituminous-coal and lignite-mining industry in the United States, 1890–1949*

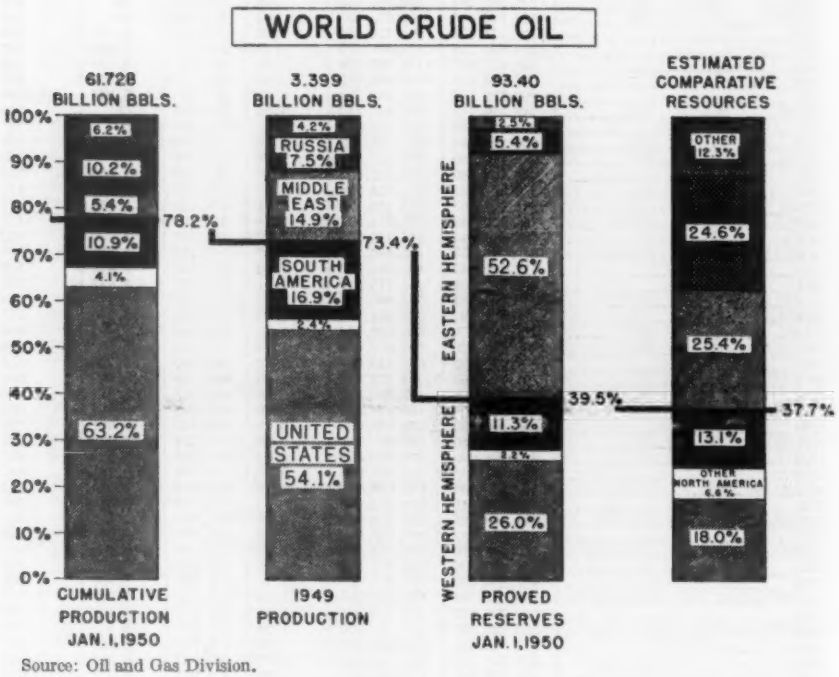
| Year | Production (net tons) | Value of production [1] | | Men employed | Number of mines | Capacity at 280 days (million tons) |
|---|---|---|---|---|---|---|
| | | Total | Average per ton | | | |
| 1890 | 111,302,322 | $110,420,801 | $0.99 | 192,204 | [2] | 137 |
| 1891 | 117,901,238 | 117,188,400 | .99 | 205,803 | [2] | 148 |
| 1892 | 126,856,567 | 125,124,381 | .99 | 212,893 | [2] | 162 |
| 1893 | 128,385,231 | 122,751,618 | .96 | 230,365 | [2] | 174 |
| 1894 | 118,820,405 | 107,653,501 | .91 | 244,603 | [2] | 196 |
| 1895 | 135,118,193 | 115,779,771 | .86 | 239,962 | 2,555 | 196 |
| 1896 | 137,640,276 | 114,891,515 | .83 | 244,171 | 2,599 | 202 |
| 1897 | 147,617,519 | 119,595,224 | .81 | 247,817 | 2,454 | 213 |
| 1898 | 166,593,623 | 132,608,713 | .80 | 255,717 | 2,862 | 221 |
| 1899 | 193,323,187 | 167,952,104 | .87 | 271,027 | 3,245 | 230 |
| 1900 | 212,316,112 | 220,930,313 | 1.04 | 304,375 | [2] | 255 |
| 1901 | 225,828,149 | 236,422,049 | 1.05 | 340,235 | [2] | 281 |
| 1902 | 260,216,844 | 290,858,483 | 1.12 | 370,056 | [2] | 316 |
| 1903 | 282,749,348 | 351,687,933 | 1.24 | 415,777 | [2] | 350 |
| 1904 | 278,659,689 | 305,397,001 | 1.10 | 437,832 | 4,650 | 386 |
| 1905 | 315,062,785 | 334,658,294 | 1.06 | 460,629 | 5,060 | 417 |
| 1906 | 342,874,867 | 381,162,115 | 1.11 | 478,425 | 4,430 | 451 |
| 1907 | 394,759,112 | 451,214,842 | 1.14 | 513,258 | 4,550 | 473 |
| 1908 | 332,573,944 | 374,135,268 | 1.12 | 516,264 | 4,730 | 482 |
| 1909 | 379,744,257 | 405,486,777 | 1.07 | 543,152 | 5,775 | 510 |
| 1910 | 417,111,142 | 469,281,719 | 1.12 | 555,533 | 5,818 | 538 |
| 1911 | 405,907,059 | 451,375,819 | 1.11 | 549,775 | 5,887 | 538 |
| 1912 | 450,104,982 | 517,983,445 | 1.15 | 548,632 | 5,747 | 566 |
| 1913 | 478,435,297 | 565,234,952 | 1.18 | 571,882 | 5,776 | 577 |
| 1914 | 422,703,970 | 493,309,244 | 1.17 | 583,506 | 5,592 | 608 |
| 1915 | 442,624,426 | 502,037,688 | 1.13 | 557,456 | 5,502 | 610 |
| 1916 | 502,519,682 | 665,116,077 | 1.32 | 561,102 | 5,726 | 613 |
| 1917 | 551,790,563 | 1,249,272,837 | 2.26 | 603,143 | 6,939 | 636 |
| 1918 | 579,385,820 | 1,491,809,940 | 2.58 | 615,305 | 8,319 | 650 |
| 1919 | 465,860,058 | 1,160,616,013 | 2.49 | 621,998 | 8,994 | 669 |
| 1920 | 568,666,683 | 2,129,933,000 | 3.75 | 639,547 | 8,921 | 725 |
| 1921 | 415,921,950 | 1,199,983,600 | 2.89 | 663,754 | 8,038 | 781 |
| 1922 | 422,268,099 | 1,274,820,000 | 3.02 | 687,958 | 9,299 | 832 |
| 1923 | 564,564,662 | 1,514,621,000 | 2.68 | 704,793 | 9,331 | 885 |
| 1924 | 483,686,538 | 1,062,626,000 | 2.20 | 619,604 | 7,586 | 792 |
| 1925 | 520,052,741 | 1,060,402,000 | 2.04 | 588,493 | 7,144 | 748 |
| 1926 | 573,366,985 | 1,183,412,000 | 2.06 | 593,647 | 7,177 | 747 |
| 1927 | 517,763,352 | 1,029,657,000 | 1.99 | 593,918 | 7,011 | 739 |
| 1928 | 500,744,970 | 933,774,000 | 1.86 | 522,150 | 6,450 | 691 |
| 1929 | 534,988,593 | 952,781,000 | 1.78 | 502,993 | 6,057 | 679 |
| 1930 | 467,526,299 | 795,483,000 | 1.70 | 493,202 | 5,891 | 700 |
| 1931 | 382,089,396 | 588,895,000 | 1.54 | 450,213 | 5,642 | 669 |
| 1932 | 309,709,872 | 406,677,000 | 1.31 | 406,380 | 5,427 | 594 |
| 1933 | 333,630,533 | 445,788,000 | 1.34 | 418,703 | 5,555 | 559 |
| 1934 | 359,368,022 | 628,383,000 | 1.75 | 458,011 | 6,258 | 565 |
| 1935 | 372,373,122 | 658,063,000 | 1.77 | 462,403 | 6,315 | 582 |
| 1936 | 439,087,903 | 770,955,000 | 1.76 | 477,204 | 6,875 | 618 |
| 1937 | 445,531,449 | 864,042,000 | 1.94 | 491,864 | 6,548 | 646 |
| 1938 | 348,544,764 | 678,653,000 | 1.95 | 441,333 | 5,777 | 602 |
| 1939 | 394,855,325 | 728,348,366 | 1.84 | 421,788 | 5,820 | 621 |
| 1940 | 460,771,500 | 879,327,227 | 1.91 | 439,075 | 6,324 | 639 |
| 1941 | 514,149,245 | 1,125,362,836 | 2.19 | 456,981 | 6,822 | 666 |
| 1942 | 582,692,937 | 1,373,990,608 | 2.36 | 461,991 | 6,972 | 663 |
| 1943 | 590,177,069 | 1,584,644,477 | 2.69 | 416,007 | 6,620 | 626 |
| 1944 | 619,576,240 | 1,810,900,542 | 2.92 | 393,347 | 6,928 | 624 |
| 1945 | 577,617,327 | 1,768,204,320 | 3.06 | 383,100 | 7,033 | 620 |
| 1946 | 533,922,068 | 1,835,539,476 | 3.44 | [3] 396,434 | 7,333 | 699 |
| 1947 | 630,623,722 | 2,622,634,946 | 4.16 | [3] 419,182 | 8,700 | 755 |
| 1948 | 599,518,229 | 2,993,153,747 | 4.99 | [3] 441,631 | 9,079 | 774 |
| 1949 | 437,868,036 | 2,136,870,571 | 4.88 | 433,698 | 8,559 | 781 |

[1] Figures for 1890 to 1936 and 1939 exclude selling expense. Figures for 1937–38 and 1940–49 include selling expense.
[2] Data not available.
[3] Average number of men working daily.

*Petroleum*

As regards petroleum, United States production is and has been an even more substantial part of the world's total than in the case of coal (table D–2). In 1949 United States production of slightly more than 1.8 billion barrels was about 54 percent of the world total of 3.4 billions of barrels. Even more striking is the chart of cumulative production to early 1950 shown in (fig. D–1). Of the total oil which

FIGURE D–1.




Source: Oil and Gas Division.

has been taken from the ground, 63.2 percent has come from the United States and 78.2 percent from the Western Hemisphere. The U. S. S. R. in contrast accounted for only 7.5 percent in 1949 and has produced at any time in her history only 10.2 percent of the world's total.

The geographic distribution of oil production within the United States has shifted with time as old fields have diminished and new fields have been brought in (table D–9). The over-all trend has been sharply upward (fig. D–2). The only major set-back occurred during the economic difficulties of the early 1930's. This period coincided also with the State enforcement of crude oil production regulations. Distribution of production by States for a recent period is shown in tables D–10, and D–11. Texas is far in the lead with a good 40 percent of the total production during these years and of the cumulative total since discovery, chiefly as a result of the tremendous output of the east Texas field.

FIGURE D–2.—TOTAL SUPPLY, ALL OILS, 1918–49.

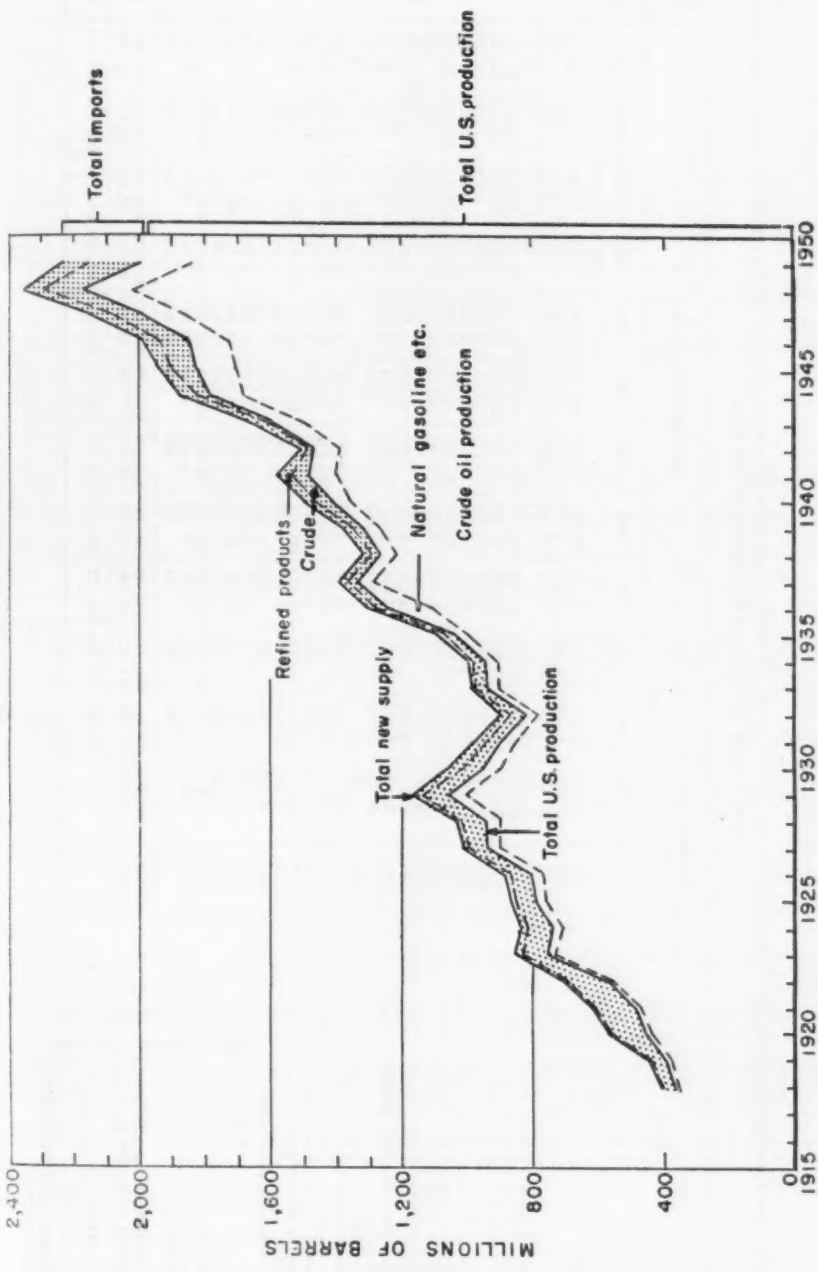



FIGURE D-2.—TOTAL SUPPLY, ALL OILS, 1918–49.

Source: U. S. Bureau of Mines.

TABLE D–3.—*Coal produced in the United States, by States, 1939–49, with production of maximum year and cumulative production from earliest record to end of 1949, in thousands of net tons*

| State | Maximum production | | Production by years | | | | | | | | | | | Total production from earliest record to end of 1949 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year | Quantity | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | |
| Alabama | 1926 | 21,001 | 12,047 | 15,324 | 15,464 | 19,301 | 17,160 | 18,752 | 18,236 | 16,183 | 19,048 | 18,801 | 12,934 | 822,278 |
| Arkansas | 1907 | 2,670 | 1,152 | 1,454 | 1,574 | 1,985 | 1,718 | 1,972 | 1,854 | 1,631 | 1,871 | 1,662 | 962 | 91,376 |
| Colorado | 1917 | 12,483 | 5,923 | 6,589 | 6,949 | 8,086 | 8,324 | 8,168 | 7,621 | 5,914 | 6,358 | 5,631 | 4,636 | 471,121 |
| Georgia | 1903 | 416 | (1) | (1) | (1) | 31 | 14 | 24 | 43 | 114 | 7 | 20 | (1) | (1) |
| Illinois | 1918 | 89,291 | 46,783 | 50,610 | 54,703 | 65,071 | 72,631 | 76,792 | 73,011 | 63,469 | 67,860 | 65,342 | 47,208 | 3,131,283 |
| Indiana | 1918 | 30,679 | 16,943 | 18,869 | 22,484 | 25,388 | 25,065 | 27,962 | 25,183 | 21,697 | 25,449 | 23,849 | 16,550 | 985,288 |
| Iowa | 1917 | 8,966 | 2,948 | 3,231 | 2,939 | 2,948 | 2,771 | 2,141 | 2,046 | 1,788 | 1,684 | 1,670 | 1,725 | 337,733 |
| Kansas | 1918 | 7,562 | 2,675 | 3,579 | 4,008 | 4,230 | 3,437 | 3,369 | 3,228 | 2,493 | 2,745 | 2,538 | 2,031 | 266,051 |
| Kentucky | 1947 | 84,241 | 42,557 | 49,141 | 53,710 | 62,231 | 63,211 | 71,356 | 69,593 | 66,553 | 84,241 | 82,084 | 62,583 | 1,955,774 |
| Maryland | 1907 | 5,533 | 1,443 | 1,503 | 1,701 | 2,001 | 1,933 | 1,870 | 1,763 | 2,003 | 2,051 | 1,661 | 668 | 259,825 |
| Michigan | 1907 | 2,036 | 457 | 410 | 311 | 231 | 169 | 140 | 126 | 80 | 14 | 13 | 12 | 46,373 |
| Missouri | 1917 | 5,671 | 3,273 | 3,097 | 3,145 | 3,520 | 4,310 | 4,779 | 3,983 | 3,733 | 4,236 | 4,023 | 3,647 | 257,468 |
| Montana (bituminous and lignite) | 1944 | 4,844 | 2,804 | 2,867 | 3,254 | 3,829 | 4,833 | 4,844 | 4,467 | 3,723 | 3,178 | 2,898 | 2,766 | 157,263 |
| New Mexico | 1918 | 4,023 | 1,230 | 1,111 | 1,251 | 1,669 | 1,851 | 1,744 | 1,484 | 1,280 | 1,443 | 1,364 | 1,004 | 121,440 |
| North Carolina | 1922 | 79 | | | | | | | | | | | (1) | (1) |
| North Dakota (lignite) | 1949 | 2,967 | 2,072 | 2,218 | 2,309 | 2,537 | 2,500 | 2,366 | 2,522 | 2,555 | 2,760 | 2,961 | 2,967 | 67,640 |
| Ohio | 1920 | 45,878 | 20,289 | 22,772 | 29,319 | 32,764 | 32,255 | 33,877 | 32,737 | 32,314 | 37,548 | 38,708 | 30,961 | 1,697,682 |
| Oklahoma | 1920 | 4,849 | 1,188 | 1,646 | 1,771 | 2,387 | 2,838 | 3,209 | 2,909 | 2,647 | 3,421 | 3,462 | 3,022 | 158,775 |
| Pennsylvania (bituminous) | 1918 | 178,551 | 92,584 | 116,603 | 130,240 | 144,073 | 141,050 | 146,052 | 132,965 | 125,497 | 147,079 | 134,542 | 89,215 | 7,365,791 |
| Tennessee | 1942 | 8,158 | 5,185 | 6,008 | 7,045 | 8,158 | 7,179 | 7,266 | 6,271 | 5,618 | 6,258 | 6,483 | 4,172 | 324,312 |
| Texas (bituminous and lignite) | 1913 | 2,429 | 826 | 621 | 353 | 304 | 153 | [2] 109 | [2] 80 | [2] 56 | [2] 61 | [2] 57 | 49 | 60,911 |
| Utah | 1947 | 7,429 | 3,285 | 3,576 | 4,077 | 5,517 | 6,666 | 7,119 | 6,679 | 5,994 | 7,429 | 6,813 | 6,160 | 197,866 |
| Virginia | 1943 | 20,280 | 13,531 | 15,348 | 18,441 | 20,136 | 20,280 | 19,514 | 17,235 | 15,527 | 20,171 | 17,999 | 14,584 | 554,123 |
| Washington | 1918 | 4,082 | 1,690 | 1,650 | 1,841 | 1,953 | 1,528 | 1,524 | 1,357 | 991 | 1,118 | 1,220 | 899 | 142,449 |
| West Virginia | 1947 | 176,157 | 108,362 | 126,438 | 140,250 | 155,882 | 158,804 | 164,704 | 152,035 | 144,020 | 176,157 | 168,862 | 122,610 | 4,961,743 |
| Wyoming | 1945 | 9,847 | 5,373 | 5,808 | 6,646 | 8,133 | 9,155 | 9,540 | 9,847 | 7,635 | 8,051 | 6,412 | 6,001 | 363,461 |
| Other States | | | 235 | 299 | 364 | 328 | 342 | 383 | 342 | 407 | 386 | 443 | 502 | 65,979 |
| Total bituminous and lignite | 1947 | 630,624 | 394,855 | 460,772 | 514,149 | 582,693 | 590,177 | 619,576 | 577,617 | 533,922 | 630,624 | 599,518 | 437,868 | 24,864,005 |
| Pennsylvania anthracite | 1917 | 99,612 | 51,487 | 51,485 | 56,368 | 60,328 | 60,644 | 63,701 | 54,934 | 60,507 | 57,190 | 57,140 | 42,702 | 4,898,943 |
| Grand total | | | 446,342 | 512,257 | 570,517 | 643,021 | 650,821 | 683,277 | 632,551 | 594,429 | 687,814 | 656,658 | 480,570 | 29,762,948 |

[1] Included with "Other States."
[2] Lignite only.

TABLE D–4.—*World production of anthracite, in metric tons, 1943–48* [1]

| Country [1] | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|
| China [2] | (3) | (3) | 1,451,000 | 757,114 | 878,062 | (3) |
| France | 8,205,000 | 4,964,000 | 6,611,458 | 8,313,230 | (3) | (3) |
| Indochina, French | 954,500 | 499,400 | 217,700 | 261,696 | 247,777 | 340,315 |
| Ireland | 123,387 | 130,198 | 123,468 | 122,886 | 121,824 | 180,000 |
| Italy | 122,075 | 59,028 | 53,446 | 104,989 | 115,731 | [4] 80,000 |
| Korea | 4,157,101 | 4,530,262 | 673,796 | [4] 1,071,800 | [4] 1,815,200 | [5] 699,234 |
| Morocco, French | 102,290 | 134,400 | 178,600 | 221,750 | 268,500 | 290,300 |
| New Zealand | (3) | (3) | 2,571 | 2,308 | 1,632 | 1,773 |
| Peru | 22,716 | 14,545 | 36,848 | 82,089 | 82,045 | 45,969 |
| Portugal [6] | 368,321 | 389,638 | 436,117 | 379,526 | 377,000 | 386,763 |
| Rumania | 21,476 | 12,000 | 17,000 | 15,994 | 23,779 | (3) |
| Spain | 1,151,762 | 1,516,035 | 1,529,532 | 1,457,529 | 1,411,355 | 1,421,685 |
| Switzerland | 104,150 | 51,232 | 101,993 | 74,544 | 15,066 | (3) |
| United Kingdom | 4,196,671 | 3,652,881 | 3,213,405 | 3,582,084 | (3) | (3) |
| United States (Pennsylvania) | 55,014,679 | 57,788,602 | 49,834,944 | 54,890,625 | 51,881,632 | 51,836,218 |
| Total (estimate) | 116,414,000 | 112,550,000 | 103,622,000 | 117,466,000 | 118,908,000 | 120,815,000 |

[1] In addition to countries listed, Belgium, Bulgaria, Germany, Japan, and U. S. S. R. produce anthracite but data of output are not available. Estimates by author of chapter included in total.
[2] Excludes Kwantung Peninsula.
[3] Data not available; estimate by author of chapter included in total.
[4] Estimate.
[5] South Korea only.
[6] Quality in doubt; may be bituminous.

TABLE D–5.—*Pennsylvania anthracite produced, 1944–49, by fields, in net tons*

[The figures of breaker product include a certain quantity of culm-bank coal, which amounted to 3,989,580 tons in 1948]

| Field | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|
| Eastern Middle: | | | | | | |
| Breakers | 5,905,623 | [1] 5,005,245 | 5,057,619 | 4,270,240 | 4,467,628 | 3,379,672 |
| Washeries | 403,688 | [1] 342,116 | 282,481 | 315,014 | 298,601 | 238,532 |
| Total Eastern Middle | 6,309,311 | 5,347,361 | 5,340,100 | 4,585,254 | 4,766,229 | 3,618,204 |
| Western Middle: | | | | | | |
| Breakers | 12,721,704 | 11,540,524 | 13,040,147 | 12,147,528 | 12,405,178 | 9,636,954 |
| Washeries | 538,875 | 130,789 | 530,246 | 591,652 | 240,157 | 135,690 |
| Dredges | 385,137 | 308,976 | 362,423 | 411,804 | 311,183 | 246,905 |
| Total Western Middle | 13,645,716 | 11,980,289 | 13,932,816 | 13,150,984 | 12,956,518 | 10,019,529 |
| Southern: | | | | | | |
| Breakers | 12,194,069 | 10,916,769 | 11,817,427 | 11,643,971 | 11,622,538 | 8,776,671 |
| Washeries | 2,091,473 | 1,373,578 | 1,386,125 | 237,131 | 496,194 | 484,595 |
| Dredges | 983,046 | 896,250 | 761,131 | 796,174 | 664,350 | 603,217 |
| Total Southern | 15,268,588 | 13,186,597 | 13,964,683 | 12,677,276 | 12,783,082 | 9,864,483 |
| Northern: | | | | | | |
| Breakers | 27,794,639 | [1] 23,503,306 | 26,227,918 | 25,831,439 | 25,839,648 | 18,579,955 |
| Washeries | 531,338 | [1] 735,041 | 925,427 | 890,368 | 719,676 | 584,436 |
| Dredges | 4,554 | ---------- | 8,840 | 11,728 | 12,471 | 15,000 |
| Total Northern | 28,330,531 | 24,238,347 | 27,162,185 | 26,733,535 | 26,571,795 | 19,179,418 |
| Total, excluding Sullivan County: | | | | | | |
| Breakers | 58,616,035 | [1] 50,965,844 | 56,143,111 | 53,893,178 | 54,334,992 | 40,373,252 |
| Washeries | 3,565,374 | [1] 2,581,524 | 3,124,279 | 2,034,165 | 1,754,628 | 1,443,260 |
| Dredges | 1,372,737 | 1,205,226 | 1,132,394 | 1,219,706 | 988,004 | 865,122 |
| Total, excluding Sullivan County | 63,554,146 | 54,752,594 | 60,399,784 | 57,147,049 | 57,077,624 | 42,681,634 |
| Sullivan County: | | | | | | |
| Breakers | 147,217 | 149,505 | 85,402 | [1] 42,960 | 62,324 | 20,090 |
| Washeries | ---------- | 31,810 | 21,687 | (1) | ---------- | ---------- |
| Total Sullivan County | 147,217 | 181,315 | 107,089 | 42,960 | 62,324 | 20,090 |
| Grand total | 63,701,363 | 54,933,909 | 60,506,873 | 57,190,009 | 57,139,948 | 42,701,724 |

[1] Small quantity of washery coal included with breaker.

[1] Included with "Other States."
[2] Lignite only.

TABLE D–6.—*Statistical trends in the Pennsylvania anthracite industry, 1890–1948*

| Year | Production (net tons) | Value of production | Average value per net ton | Exports [1] (net tons) | Imports [1] (net tons) | Apparent consumption [2] (net tons) |
|---|---|---|---|---|---|---|
| 1890 | 46, 468, 641 | $66, 383, 772 | $1. 43 | 889, 655 | 16, 962 | 45, 596, 000 |
| 1891 | 50, 665, 431 | 73, 944, 735 | 1. 46 | 964, 601 | 42, 120 | 49, 743, 000 |
| 1892 | 52, 472, 504 | 82, 442, 000 | 1. 57 | 953, 836 | 72, 865 | 51, 592, 000 |
| 1893 | 53, 967, 543 | 85, 687, 078 | 1. 59 | 1, 493, 281 | 60, 220 | 52, 534, 000 |
| 1894 | 51, 921. 121 | 78, 488, 063 | 1. 51 | 1, 613, 500 | 100, 876 | 50, 408, 000 |
| 1895 | 57, 999, 337 | 82, 019, 272 | 1. 41 | 1, 647, 195 | 158, 297 | 56, 510, 000 |
| 1896 | 54, 346, 081 | 81, 748, 651 | 1 50 | 1, 512, 000 | 113, 892 | 52, 948, 000 |
| 1897 | 52, 611, 681 | 79, 301. 954 | 1. 51 | 1, 454, 620 | 27, 478 | 51, 185, 000 |
| 1898 | 53, 382, 645 | 75, 414, 537 | 1. 41 | 1, 513, 062 | 3, 527 | 51, 873, 000 |
| 1899 | 60, 418, 005 | 88, 142, 130 | 1. 46 | 1, 912, 732 | 68 | 58, 505, 000 |
| 1900 | 57, 367, 915 | 85, 757, 851 | 1. 49 | 1, 853, 163 | 132 | 55, 515, 000 |
| 1901 | 67, 471, 667 | 112, 504, 020 | 1. 67 | 2, 232, 504 | 320 | 65, 239. 000 |
| 1902 | 41, 373, 595 | 76, 173, 586 | 1. 84 | 1, 016, 934 | 190, 636 | 40, 547, 000 |
| 1903 | 74, 607, 088 | 152, 036, 448 | 2. 04 | 2, 219, 920 | 196, 837 | 72, 554, 000 |
| 1904 | 73, 156, 709 | 138, 974, 020 | 1. 90 | 2, 495, 799 | 81, 232 | 70, 742, 000 |
| 1905 | 77, 659, 850 | 141, 879, 000 | 1. 83 | 2, 497, 581 | 38, 350 | 75, 201, 000 |
| 1906 | 71, 282, 411 | 131, 917, 694 | 1. 85 | 2, 483, 005 | 36, 236 | 68, 836, 000 |
| 1907 | 85, 604, 312 | 163, 584, 056 | 1. 91 | 3, 021, 841 | 11, 085 | 82, 594, 000 |
| 1908 | 83, 268, 754 | 158, 178, 849 | 1. 90 | 3, 082, 641 | 18, 462 | 80, 205, 000 |
| 1909 | 81, 070, 359 | 149, 181, 587 | 1. 84 | 3, 183, 840 | 3, 574 | 77, 890, 000 |
| 1910 | 84, 485, 236 | 160, 275, 302 | 1. 90 | 3, 384, 222 | 9, 180 | 81, 110, 000 |
| 1911 | 90, 464, 067 | 175, 189, 392 | 1. 94 | 3, 980, 479 | 2, 759 | 86, 486, 000 |
| 1912 | 84, 361, 598 | 177, 622, 626 | 2. 11 | 4. 131, 444 | 1, 870 | 80, 232, 000 |
| 1913 | 91, 524, 922 | 195, 181. 127 | 2. 13 | 4, 652, 912 | 1, 004 | 85, 474, 000 |
| 1914 | 90, 821, 507 | 188, 181, 399 | 2. 07 | 4, 289, 873 | 17, 696 | 84, 041, 000 |
| 1915 | 88, 995, 061 | 184, 653, 498 | 2. 07 | 3, 965, 255 | 814 | 88, 144, 000 |
| 1916 | 87, 578, 493 | 202, 009, 561 | 2. 31 | 4, 665, 530 | 6, 000 | 87, 118, 000 |
| 1917 | 99, 611, 811 | 283, 650, 723 | 2. 85 | 6, 007, 306 | 13, 000 | 94, 068, 000 |
| 1918 | 98, 826, 084 | 336, 480, 347 | 3. 40 | 4, 967, 808 | 37, 272 | 92, 775, 000 |
| 1919 | 88, 092, 201 | 364, 926, 950 | 4. 14 | 4, 976, 598 | 82, 818 | 81, 518, 000 |
| 1920 | 89, 598, 249 | 434, 252, 198 | 4. 85 | 5, 403, 749 | 31, 748 | 85, 786, 000 |
| 1921 | 90, 473, 451 | 452, 304, 903 | 5. 00 | 4, 677, 368 | 8, 894 | 81, 950, 000 |
| 1922 | 54, 683, 022 | 273, 700, 125 | 5. 01 | 2, 649, 457 | 233, 528 | 56, 799, 000 |
| 1923 | 93, 339, 009 | 506, 786, 768 | 5. 43 | 5, 090, 138 | 300, 360 | 86, 914, 000 |
| 1924 | 87, 926, 862 | 477, 230, 852 | 5. 43 | 4, 017, 785 | 117, 951 | 80, 717, 000 |
| 1925 | 61, 817, 149 | 327, 664, 512 | 5. 30 | 3, 179, 006 | 382, 894 | 64, 061, 000 |
| 1926 | 84, 437, 452 | 474, 164, 252 | 5. 62 | 4, 029, 683 | 813, 956 | 77, 221, 000 |
| 1927 | 80, 095, 564 | 420, 941. 726 | 5. 26 | 3. 325, 507 | 119, 030 | 74, 672, 000 |
| 1928 | 75, 348, 069 | 393, 637, 690 | 5. 22 | 3, 336. 272 | 384, 707 | 73, 650, 000 |
| 1929 | 73, 828, 195 | 385, 642, 751 | 5. 22 | 3, 406, 369 | 487, 172 | 71, 457, 000 |
| 1930 | 69, 384, 837 | 354, 574, 191 | 5. 11 | 2, 551, 659 | 674, 812 | 67, 628, 000 |
| 1931 | 59, 645, 652 | 296, 354, 586 | 4. 97 | 1, 778, 308 | 637, 951 | 58, 408, 000 |
| 1932 | 49, 855, 221 | 222, 375, 129 | 4. 46 | 1, 303, 355 | 607, 097 | 50, 500, 000 |
| 1933 | 49, 541, 344 | 206, 718, 405 | 4. 17 | 1, 034, 562 | 456, 252 | 49, 600, 000 |
| 1934 | 57, 168, 291 | 244, 152, 245 | 4. 27 | 1. 297, 610 | 478, 118 | 55, 500, 000 |
| 1935 | 52, 158, 783 | 210, 130, 565 | 4. 03 | 1, 608, 549 | 571, 439 | 51. 100, 000 |
| 1936 | 54, 579, 535 | 227, 003, 538 | 4. 16 | 1. 678, 024 | 614, 639 | 53, 200, 000 |
| 1937 | 51, 856, 433 | 197, 598, 849 | 3. 81 | 1, 914, 173 | 395, 737 | 50, 400, 000 |
| 1938 | 46, 099, 027 | 180, 600, 167 | 3. 92 | 1, 908, 911 | 362, 895 | 45, 200, 000 |
| 1939 | 51, 487, 377 | 187, 175, 324 | 3. 64 | 2, 590, 000 | 298, 153 | 49, 700, 000 |
| 1940 | 51, 484, 640 | 205, 489, 814 | 3. 99 | 2, 667, 632 | 135, 436 | 49, 000, 000 |
| 1941 | [3] 56, 368, 267 | 240, 275, 126 | 4. 26 | 3, 380, 189 | 74, 669 | 52, 700, 000 |
| 1942 | [3] 60, 327, 729 | 271, 673, 380 | 4. 50 | 4, 438, 588 | 140, 115 | 56, 500, 000 |
| 1943 | [3] 60, 643, 620 | 306, 816, 018 | 5. 06 | 4, 138, 680 | 166, 020 | 57, 100, 000 |
| 1944 | [3] 63, 701, 363 | 354, 582, 884 | 5. 57 | 4, 185, 933 | 11, 847 | 59, 400, 000 |
| 1945 | [3] 54, 933, 909 | 323, 944, 435 | 5. 90 | 3, 691, 247 | 149 | 51, 600, 000 |
| 1946 | [3] 60, 506, 873 | 413, 417, 070 | 6. 83 | 6, 497, 245 | 9, 556 | 53, 900, 000 |
| 1947 | [3] 57, 190, 009 | 413, 019, 486 | 7. 22 | 8, 509, 995 | 10, 350 | 48, 200, 000 |
| 1948 | [3] 57, 139, 948 | 467, 051, 800 | 8. 17 | 6, 675. 914 | 945 | 50, 200, 000 |
| 1949 | 42, 701, 724 | 358, 008, 451 | 8. 38 | 4, 942, 670 | ---------- | 37, 700, 000 |

[1] U. S. Department of Commerce.
[2] Before 1913 the figures of consumption take no account of producers' stocks, there being no data available for this item.
[3] Includes some bootleg coal purchased by legitimate operators and prepared to their breakers.

TABLE D–7.—*World production of crude petroleum, 1943–49, by countries, in thousands of barrels*

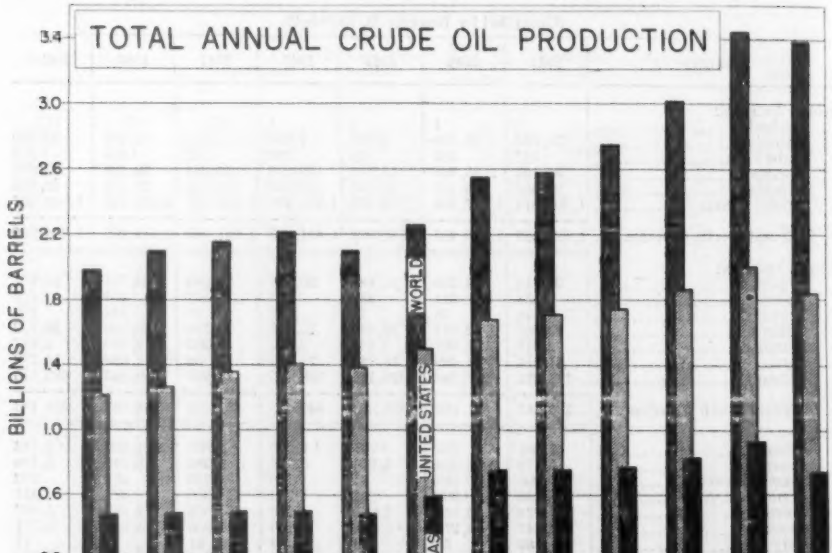
(Compiled by Berenice B. Mitchell)

| Country | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 [1] |
|---|---|---|---|---|---|---|---|
| North America: | | | | | | | |
| Barbados | 2 | 1 | 2 | 1 | [2] | [2] | [2] |
| Canada | 10,052 | 10,099 | 8,483 | 7,586 | 7,692 | 12,287 | 22,220 |
| Cuba [3] | 107 | 109 | 149 | 269 | [4] 300 | [4] 159 | [4] 206 |
| Mexico | 35,163 | 38,203 | 43,547 | 49,235 | 56,284 | 58,508 | 60,910 |
| Trinidad | 21,385 | 22,139 | 21,093 | 20,233 | 20,521 | 20,111 | 20,617 |
| United States | 1,505,613 | 1,677,904 | 1,713,655 | 1,733,939 | 1,856,987 | 2,020,185 | 1,840,307 |
| Total North America | 1,572,322 | 1,748,455 | 1,786,929 | 1,811,263 | 1,941,784 | 2,111,250 | 1,944,260 |
| South America: | | | | | | | |
| Argentina | 27,714 | 24,230 | 22,881 | 20,604 | 21,846 | 23,734 | 22,961 |
| Bolivia | 334 | 314 | 382 | 363 | 377 | 464 | 678 |
| Brazil | 48 | 58 | 79 | 67 | 97 | 144 | 109 |
| Colombia | 13,261 | 22,291 | 22,449 | 22,118 | 24,794 | 23,792 | 29,722 |
| Ecuador | 2,315 | 2,967 | 2,664 | 2,323 | 2,282 | 2,563 | 2,617 |
| Peru | 14,654 | 14,389 | 13,744 | 12,468 | 12,764 | 14,069 | 14,799 |
| Venezuela | 177,631 | 257,046 | 323,156 | 388,486 | 434,905 | 490,015 | 482,316 |
| Total South America | 235,957 | 321,295 | 385,355 | 446,429 | 497,065 | 554,781 | 553,193 |
| Europe: | | | | | | | |
| Albania | 1,001 | 334 | [4] 267 | [4] 1,000 | [4] 2,000 | [4] 1,500 | [4] 2,188 |
| Austria | 7,478 | 8,218 | 3,074 | 5,734 | 6,285 | 6,149 | 6,100 |
| Czechoslovakia | [4] 200 | [4] 185 | 91 | 196 | 210 | 204 | 292 |
| France | [4] 356 | [4] 300 | 202 | 368 | 356 | 370 | 411 |
| Germany | 4,973 | 6,154 | 3,935 | 4,539 | 4,032 | 4,489 | 5,947 |
| Hungary | 6,347 | [5] 6,277 | [5] 5,018 | 5,146 | 4,330 | 3,647 | 3,791 |
| Italy | 86 | 55 | 53 | 83 | 81 | 71 | 71 |
| Netherlands [6] | 1 | 11 | 37 | 395 | 1,340 | 3,122 | 3,912 |
| Poland | [4] 3,500 | [4] 3,000 | [7] 750 | 866 | 951 | [4] 1,039 | [4] 965 |
| Rumania | 39,182 | 26,191 | 34,772 | 31,434 | 28,552 | [4] 34,000 | [4] 33,700 |
| U. S. S. R. [8] | 200,750 | 275,000 | 148,953 | 157,673 | 187,463 | 218,000 | 233,000 |
| United Kingdom | 839 | 703 | 532 | 412 | 351 | 323 | 338 |
| Yugoslavia | 10 | 307 | 307 | 245 | 365 | 385 | 440 |
| Total Europe [9] | 264,723 | 326,735 | 197,991 | 208,091 | 236,316 | 273,299 | 291,155 |
| Asia: | | | | | | | |
| Bahrein Island | 6,572 | 6,714 | 7,309 | 8,910 | 9,411 | 10,915 | 10,985 |
| Burma | 1,000 | [4] 750 | [4] 725 | 15 | 59 | 360 | 316 |
| China | 447 | 505 | 484 | 513 | 374 | 533 | 730 |
| Formosa | 38 | 40 | 14 | 16 | 22 | 23 | 22 |
| India | 2,735 | 2,784 | 2,363 | 2,193 | 1,863 | 1,875 | 1,894 |
| Indonesia | 48,294 | 22,260 | 7,600 | 2,100 | 8,030 | [5] 31,900 | [5] 44,932 |
| Iran | 74,612 | 102,045 | 130,526 | 146,819 | 154,998 | 190,395 | 205,100 |
| Iraq | 24,848 | 30,943 | 35,112 | 35,665 | 35,834 | 26,115 | 31,000 |
| Japan | 1,727 | 1,601 | 1,544 | 1,343 | 1,276 | 1,122 | 1,353 |
| Kuwait | | | | 5,931 | 16,225 | 46,500 | 90,000 |
| Pakistan | [10] | [10] | [10] | [10] | 356 | 490 | 746 |
| Qatar | | | | | | | 750 |
| Sarawak and Brunei | [4] 4,500 | [4] 6,000 | 2,100 | 2,050 | 12,970 | 20,120 | 25,108 |
| Saudi Arabia | 4,868 | 7,794 | 21,311 | 59,944 | 89,852 | 142,853 | 174,008 |
| Turkey | | | | | | | 95 |
| U. S. S. R.: Sakhalin [4] | 5,000 | 5,000 | 6,000 | 6,000 | 7,000 | 7,000 | 7,000 |
| Total Asia [9] | 174,641 | 186,436 | 215,088 | 270,599 | 338,260 | 480,201 | 594,039 |
| Africa: | | | | | | | |
| Egypt | 8,953 | 9,416 | 9,406 | 9,070 | 8,627 | 13,398 | 15,997 |
| French Morocco | 39 | 32 | 26 | 20 | 21 | 100 | 136 |
| Total Africa | 8,992 | 9,448 | 9,432 | 9,090 | 8,648 | 13,498 | 16,133 |
| Oceania: | | | | | | | |
| Australia (Victoria) | | | | | | 1 | 1 |
| New Zealand | 2 | 2 | 3 | 2 | 2 | 2 | 7 |
| Total Oceania | 2 | 2 | 3 | 2 | 2 | 3 | 8 |
| Grand total | 2,256,637 | 2,592,371 | 2,594,798 | 2,745,474 | 3,022,075 | 3,433,032 | 3,398,788 |

[1] Preliminary.
[2] Less than 500 barrels.
[3] Natural naphtha and gas oil.
[4] Estimate.
[5] Data represents Trianon Hungary after October 1944.
[6] Data revised in accordance with recent information stating 6.3 barrels per metric ton.
[7] Beginning in 1945, postwar borders.
[8] U. S. S. R. in Asia (except Sakhalin) included with U. S. S. R. in Europe.
[9] Includes New Guinea whose production amounted to 1,725,500 barrels in 1949.
[10] Included with India.

Source: Bureau of Mines.

FIGURE D–3.—TOTAL ANNUAL CRUDE OIL PRODUCTION.




Source: Oil and Gas Division.

TABLE D–8.—*Total annual crude-oil production*

[Thousands of barrels]

| | World production | United States production | | Texas production | *Percent United States* |
|---|---|---|---|---|---|
| | | | *Daily average* | | |
| 1938 | 1, 988, 041 | 1, 214, 355 | 3, 327 | 475, 850 | 39. 2 |
| 1939 | 2, 086, 160 | 1, 264, 962 | 3, 466 | 483, 528 | 38. 2 |
| 1940 | 2, 149, 821 | 1, 353, 214 | 3, 707 | 493, 209 | 36. 4 |
| 1941 | 2, 220, 657 | 1, 402, 228 | 3, 842 | 505, 572 | 36. 0 |
| 1942 | 2, 093, 083 | 1, 386, 645 | 3, 799 | 483, 097 | 34. 8 |
| 1943 | 2, 256, 652 | 1, 505, 613 | 4, 125 | 594, 343 | 39. 5 |
| 1944 | 2, 592, 514 | 1, 677, 904 | 4, 597 | 746, 999 | 44. 5 |
| 1945 | 2, 594, 959 | 1, 713, 655 | 4, 695 | 754, 710 | 44. 0 |
| 1946 | 2, 745, 667 | 1, 733, 939 | 4, 751 | 760, 215 | 43. 9 |
| 1947 | 3, 021, 668 | 1, 856, 987 | 5, 088 | 820, 210 | 44. 2 |
| 1948 | 3, 425, 283 | 2, 020, 185 | 5, 535 | 903, 498 | 44. 9 |
| 1949 | 3, 397, 691 | 1, 840, 307 | 5, 042 | 743, 990 | 40. 4 |
| 1950: January to July | 1, 144, 393 | [1] 1, 082, 718 | 5, 107 | 440, 222 | 40. 7 |

[1] April.

Source: Department of the Interior, Oil and Gas Division, October 1950.

TABLE D–9.—*Petroleum produced in the United States, 1918–49, by States*

TABLE D–9.—*Petroleum produced in the United States, 1918–49, by States*

[Thousands of barrels of 42 gallons]

| Year | Alabama | Arkansas | California | Colorado | Florida | Illinois | Indiana | Kansas | Kentucky | Louisiana | Michigan | Mississippi | Missouri | Montana |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1918 | | | 97, 532 | 143 | | 13, 366 | 878 | 45, 451 | 4, 368 | 16, 043 | (1) | | | 69 |
| 1919 | | | 101, 183 | 121 | | 11, 960 | 972 | 33, 048 | 9, 278 | 17, 188 | (1) | | (1) | 90 |
| 1920 | | (1) | 103, 377 | 111 | | 10, 774 | 945 | 39, 005 | 8, 738 | 35, 714 | | | (1) | 340 |
| 1921 | | 10, 473 | 112, 600 | 108 | | 10, 043 | 1, 158 | 36, 456 | 9, 013 | 27, 103 | | | (1) | 1, 509 |
| 1922 | | 12, 712 | 138, 468 | 97 | | 9, 383 | 1, 087 | 31, 766 | 8, 973 | 35, 376 | | | (1) | 2, 449 |
| 1923 | | 36, 610 | 262, 876 | 86 | | 8, 707 | 1, 043 | 28, 250 | 8, 069 | 24, 919 | | | (1) | 2, 782 |
| 1924 | | 46, 028 | 228, 933 | 445 | | 8, 081 | 935 | 28, 836 | 7, 407 | 21, 124 | | | | 2, 815 |
| 1925 | | 77, 398 | 232, 492 | 1, 226 | | 7, 863 | 829 | 38, 357 | 6, 759 | 20, 272 | 4 | | | 4, 091 |
| 1926 | | 58, 332 | 224, 673 | 2, 768 | | 7, 760 | 808 | 41, 498 | 6, 274 | 23, 201 | 94 | | | 7, 727 |
| 1927 | | 40, 005 | 231, 196 | 2, 831 | | 6, 994 | 852 | 41, 069 | 6, 719 | 22, 818 | 439 | | | 5, 058 |
| 1928 | | 32, 096 | 231, 811 | 2, 774 | | 6, 462 | 1, 052 | 38, 596 | 7, 359 | 21, 847 | 594 | | | 4, 015 |
| 1929 | | 24, 917 | 292, 534 | 2, 358 | | 6, 319 | 981 | 42, 813 | 7, 775 | 20, 554 | 4, 528 | | | 3, 980 |
| 1930 | | 19, 702 | 227, 329 | 1, 656 | | 5, 736 | 994 | 41, 638 | 7, 389 | 23, 272 | 3, 911 | | | 3, 349 |
| 1931 | | 14, 791 | 188, 830 | 1, 545 | | 5, 039 | 840 | 37, 018 | 6, 456 | 21, 804 | 3, 789 | | | 2, 830 |
| 1932 | | 12, 051 | 178, 128 | 1, 136 | | 4, 673 | 806 | 34, 848 | 6, 287 | 21, 807 | 6, 910 | | | 2, 457 |
| 1933 | | 11, 686 | 172, 010 | 919 | | 4, 244 | 737 | 41, 976 | 4, 608 | 25, 168 | 7, 942 | (1) | (1) | 2, 273 |
| 1934 | | 11, 182 | 174, 305 | 1, 139 | | 4, 479 | 838 | 46, 482 | 4, 860 | 32, 869 | 10, 603 | (1) | (1) | 3, 603 |
| 1935 | | 11, 008 | 207, 832 | 1, 560 | | 4, 322 | 777 | 54, 843 | 5, 258 | 50, 330 | 15, 776 | (1) | (2) | 4, 603 |
| 1936 | | 10, 469 | 214, 773 | 1, 650 | | 4, 475 | 822 | 58, 317 | 5, 633 | 80, 491 | 11, 928 | | (2) | 5, 868 |
| 1937 | | 11, 764 | 238, 521 | 1, 605 | | 7, 499 | 844 | 70, 761 | 5, 484 | 90, 924 | 16, 628 | | (2) | 5, 805 |
| 1938 | | 18, 180 | 249, 749 | 1, 412 | | 24, 075 | 995 | 60, 064 | 5, 821 | 95, 208 | 18, 745 | | (2) | 4, 946 |
| 1939 | | 21, 238 | 224, 354 | 1, 404 | | 94, 912 | 1, 711 | 60, 703 | 5, 621 | 93, 646 | 23, 462 | 107 | 40 | 5, 960 |
| 1940 | | 25, 775 | 223, 881 | 1, 626 | | 147, 647 | 4, 978 | 66, 139 | 5, 188 | 103, 584 | 19, 753 | 4, 400 | 44 | 6, 728 |
| 1941 | | 26, 327 | 230, 263 | 2, 150 | | 132, 393 | 7, 411 | 83, 242 | 4, 762 | 115, 908 | 16, 359 | 15, 327 | 47 | 7, 526 |
| 1942 | | 26, 628 | 248, 326 | 2, 199 | | 106, 391 | 6, 743 | 97, 636 | 4, 534 | 115, 785 | 21, 754 | 28, 833 | 36 | 8, 074 |
| 1943 | | 27, 600 | 284, 188 | 2, 320 | 4 | 82, 260 | 5, 283 | 106, 178 | 7, 883 | 123, 592 | 20, 768 | 18, 807 | 36 | 7, 916 |
| 1944 | 43 | 29, 418 | 311, 793 | 3, 083 | 12 | 77, 413 | 5, 118 | 98, 762 | 9, 621 | 129, 645 | 18, 490 | 16, 337 | 45 | 8, 647 |
| 1945 | 181 | 28, 613 | 326, 482 | 5, 036 | 30 | 75, 094 | 4, 868 | 96, 415 | 10, 325 | 131, 051 | 17, 267 | 19, 062 | 45 | 8, 420 |
| 1946 | 380 | 28, 375 | 314, 713 | 11, 856 | 57 | 75, 297 | 6, 726 | 97, 218 | 10, 578 | 143, 669 | 17, 074 | 24, 298 | 51 | 8, 825 |
| 1947 | 396 | 29, 948 | 333, 132 | 15, 702 | 259 | 66, 459 | 6, 095 | 105, 132 | 9, 397 | 160, 128 | 16, 215 | 34, 925 | 55 | 8, 742 |
| 1948 | 466 | 31, 682 | 340, 074 | 17, 862 | 290 | 64, 808 | 6, 974 | 110, 908 | 8, 801 | 181, 458 | 16, 871 | 45, 761 | 31 | 9, 382 |
| 1949 | 462 | 29, 936 | 332, 839 | 23, 790 | 441 | 64, 583 | 9, 556 | 101, 868 | 8, 656 | 190, 715 | 16, 495 | 37, 966 | 46 | 9, 149 |

See footnotes at end of table, p. 82.

TABLE D–9.—*Petroleum produced in the United States, 1918–49, by States*—Continued

| Year | Nebraska | New Mexico | New York | Ohio | Oklahoma | Pennsylvania | Tennessee | Texas | Virginia | West Virginia | Wyoming | Other [1] | United States total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Quantity | Value at wells | |
| | | | | | | | | | | | | | | Total (thousands of dollars) | Average per barrel |
| 1918 | | | 809 | 7,285 | 103,347 | 7,408 | | 38,750 | | 7,867 | 12,596 | 16 | 355,928 | 703,944 | $1.98 |
| 1919 | | (1) | 851 | 7,736 | 86,911 | 8,137 | | 79,366 | | 8,327 | 13,172 | 27 | 378,367 | 760,266 | 2.01 |
| 1920 | | (1) | 906 | 7,400 | 106,206 | 7,438 | | 96,868 | | 8,249 | 16,831 | 27 | 442,929 | 1,360,745 | 3.07 |
| 1921 | | (1) | 988 | 7,335 | 114,634 | 7,418 | | 106,166 | | 7,822 | 19,333 | 24 | 472,183 | 814,745 | 1.73 |
| 1922 | | (1) | 1,000 | 6,781 | 149,571 | 7,425 | | 118,684 | | 7,021 | 26,715 | 23 | 557,531 | 895,111 | 1.61 |
| 1923 | | (1) | 1,250 | 7,085 | 160,929 | 7,609 | | 131,023 | | 6,358 | 44,785 | 26 | 732,407 | 978,430 | 1.34 |
| 1924 | | 98 | 1,440 | 6,811 | 173,538 | 7,486 | | 134,522 | | 5,920 | 39,498 | 23 | 713,940 | 1,022,683 | 1.43 |
| 1925 | | 1,060 | 1,695 | 7,212 | 176,768 | 8,097 | | 144,648 | | 5,763 | 29,173 | 36 | 763,743 | 1,284,960 | 1.68 |
| 1926 | | 1,666 | 1,956 | 7,272 | 179,195 | 8,961 | | 166,916 | | 5,946 | 25,776 | 51 | 770,874 | 1,447,760 | 1.88 |
| 1927 | | 1,226 | 2,242 | 7,593 | 277,775 | 9,526 | | 217,389 | | 6,023 | 21,307 | 67 | 901,129 | 1,172,830 | 1.30 |
| 1928 | | 943 | 2,603 | 7,015 | 249,857 | 9,956 | | 257,320 | | 5,661 | 21,461 | 52 | 901,474 | 1,054,880 | 1.17 |
| 1929 | | 1,830 | 3,377 | 6,743 | 255,004 | 11,820 | | 296,876 | | 5,574 | 19,314 | 26 | 1,007,323 | 1,280,417 | 1.27 |
| 1930 | | 10,189 | 3,647 | 6,486 | 216,486 | 12,803 | | 290,457 | | 5,071 | 17,868 | 28 | 898,011 | 1,070,200 | 1.19 |
| 1931 | | 15,227 | 3,363 | 5,327 | 180,574 | 11,892 | | 332,437 | | 4,472 | 14,834 | 13 | 851,081 | 550,630 | .65 |
| 1932 | | 12,455 | 3,508 | 4,644 | 153,244 | 12,412 | | 312,478 | | 3,876 | 13,418 | 21 | 785,159 | 680,460 | .87 |
| 1933 | | 14,116 | 3,181 | 4,235 | 182,251 | 12,624 | | 402,609 | | 3,815 | 11,227 | 35 | 905,656 | 608,000 | .67 |
| 1934 | | 16,864 | 3,804 | 4,234 | 180,107 | 14,478 | | 381,516 | | 4,095 | 12,556 | 51 | 908,065 | 904,825 | 1.00 |
| 1935 | | 20,483 | 4,236 | 4,082 | 185,288 | 15,810 | (2) | 392,666 | | 3,902 | 13,755 | 65 | 996,595 | 961,440 | .965 |
| 1936 | | 27,223 | 4,663 | 3,847 | 206,555 | 17,070 | (2) | 427,411 | | 3,847 | 14,582 | 63 | 1,099,687 | 1,199,820 | 1.091 |
| 1937 | | 38,854 | 5,478 | 3,559 | 228,839 | 19,189 | (2) | 510,318 | | 3,845 | 19,166 | 77 | 1,279,160 | 1,513,340 | 1.18 |
| 1938 | | 35,759 | 5,045 | 3,298 | 174,994 | 17,426 | (2) | 475,850 | | 3,684 | 19,022 | 82 | 1,214,355 | 1,373,060 | 1.13 |
| 1939 | 2 | 37,637 | 5,098 | 3,156 | 159,913 | 17,382 | 50 | 483,528 | | 3,580 | 21,454 | 4 | 1,264,962 | 1,294,470 | 1.02 |
| 1940 | 276 | 39,129 | 4,999 | 3,159 | 156,164 | 17,353 | 24 | 493,209 | | 3,444 | 25,711 | 3 | 1,353,214 | 1,385,440 | 1.02 |
| 1941 | 1,898 | 39,569 | 5,185 | 3,510 | 154,702 | 16,750 | 12 | 505,572 | | 3,433 | 29,878 | 4 | 1,402,228 | 1,602,000 | 1.14 |
| 1942 | 1,237 | 31,544 | 5,421 | 3,543 | 140,690 | 17,779 | 9 | 483,097 | | 3,574 | 32,812 | | 1,386,645 | 1,643,470 | 1.19 |
| 1943 | 635 | 38,896 | 5,059 | 3,322 | 123,152 | 15,757 | 10 | 594,343 | 2 | 3,349 | 34,253 | | 1,505,613 | 1,809,020 | 1.20 |
| 1944 | 417 | 39,555 | 4,697 | 2,937 | 124,616 | 14,118 | 9 | 746,699 | 3 | 3,070 | 33,356 | | 1,677,904 | 2,032,960 | 1.21 |
| 1945 | 305 | 37,351 | 4,648 | 2,828 | 139,299 | 12,515 | 8 | 754,710 | 4 | 2,879 | 36,219 | | 1,713,655 | 2,094,250 | 1.22 |
| 1946 | 293 | 36,814 | 4,863 | 2,908 | 134,794 | 12,996 | 10 | 769,215 | 23 | 2,929 | 38,977 | | 1,733,939 | 2,442,550 | 1.41 |
| 1947 | 229 | 40,926 | 4,762 | 3,108 | 141,019 | 12,690 | 8 | 820,210 | 61 | 2,617 | 44,772 | | 1,856,987 | 3,577,890 | 1.93 |
| 1948 | 215 | 47,969 | 4,621 | 3,600 | 154,455 | 12,667 | 19 | 903,498 | 33 | 2,692 | 55,032 | 16 | 2,020,185 | 2,016,282 | 2.58 |
| 1949 | 330 | 47,932 | 4,248 | 3,433 | 151,902 | 11,374 | 22 | 743,990 | 43 | 2,839 | 46,935 | 757 | 1,840,307 | 4,674,380 | 2.54 |

[1] Includes Alaska 1918–33, Arkansas 1920, Michigan 1918–19, Mississippi 1933–34, Missouri 1919–23, 1932–34, New Mexico 1919–23, Tenneessee 1918–34, Utah 1920, 1924–34.
[2] Included under other.
[3] Other includes Mississippi, Missouri, Tennessee, and Utah in 1935; in 1936, 1937, and 1938 includes Missouri, Tennessee, and Utah; in 1939, 1940, 1941 is Utah only.

Source: U. S. Bureau of Mines.

TABLE D–10.—*Petroleum produced in the United States, 1944–49, and total, 1859–1948, by States* [1]

[Thousands of barrels]

| | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 [2] | 1859–1949 (total) |
|---|---|---|---|---|---|---|---|
| Production: | | | | | | | |
| Alabama | 43 | 181 | 380 | 396 | 466 | 462 | 1,928 |
| Arkansas | 29,418 | 28,613 | 28,375 | 29,948 | 31,682 | 29,936 | 764,944 |
| California | 311,793 | 326,482 | 314,713 | 333,132 | 340,074 | 332,839 | 8,291,888 |
| Colorado | 3,083 | 5,036 | 11,856 | 15,702 | 17,862 | 23,934 | 124,038 |
| Florida | 12 | 30 | 57 | 259 | 290 | 441 | 1,093 |
| Illinois | 77,413 | 75,094 | 75,297 | 66,459 | 64,808 | 64,583 | 1,444,370 |
| Indiana | 5,118 | 4,868 | 6,726 | 6,095 | 6,974 | 9,556 | 189,884 |
| Kansas | 98,762 | 96,415 | 97,218 | 105,132 | 110,908 | 101,868 | [3] 2,018,292 |
| Kentucky | 9,621 | 10,325 | 10,578 | 9,397 | 8,801 | 8,656 | [4] 241,718 |
| Louisiana | 129,645 | 131,051 | 143,669 | 160,128 | 181,458 | 190,715 | 2,351,940 |
| Michigan | 18,490 | 17,267 | 17,074 | 16,215 | 16,871 | 16,495 | [5] 306,399 |
| Mississippi | 16,337 | 19,062 | 24,298 | 34,925 | 45,761 | 37,966 | 245,823 |
| Montana | 8,647 | 8,420 | 8,825 | 8,742 | 9,382 | 9,149 | 160,173 |
| Nebraska | 417 | 305 | 293 | 229 | 215 | 330 | 5,837 |
| New Mexico | 39,555 | 37,351 | 36,814 | 40,926 | 47,369 | 47,932 | [6] 635,315 |
| New York | 4,697 | 4,648 | 4,863 | 4,762 | 4,621 | 4,248 | [7] 162,281 |
| Ohio | 2,937 | 2,828 | 2,908 | 3,108 | 3,600 | 3,433 | 617,566 |
| Oklahoma | 124,616 | 139,299 | 134,794 | 141,019 | 154,455 | 151,902 | 6,070,752 |
| Pennsylvania | 14,118 | 12,515 | 12,996 | 12,690 | 12,667 | 11,374 | 1,123,714 |
| Texas | 746,699 | 754,710 | 760,215 | 820,210 | 903,498 | 743,990 | 12,892,141 |
| West Virginia | 3,070 | 2,879 | 2,929 | 2,617 | 2,692 | 2,839 | 438,152 |
| Wyoming | 33,356 | 36,219 | 38,977 | 44,772 | 55,032 | 46,935 | 853,212 |
| Other States [8] | 57 | 57 | 84 | 124 | 99 | 724 | 2,421 |
| Total | 1,677,904 | 1,713,655 | 1,733,939 | 1,856,987 | 2,020,185 | 1,840,307 | 38,943,881 |
| Value at wells: | | | | | | | |
| Total (thousands of dollars) | 2,032,960 | 2,094,250 | 2,442,550 | 3,577,890 | 5,245,080 | 4,667,480 | 53,320,188 |
| Average per barrel | $1.21 | $1.22 | $1.41 | $1.93 | $2.60 | $2.54 | $1.37 |

[1] For detailed figures by States, 1859–1935, see Minerals Yearbook, 1937, p. 1008.
[2] Subject to revision.
[3] Oklahoma included with Kansas in 1905 and 1906.
[4] Includes Tennessee, 1883–1907.
[5] Figures represent 1925–48 production only; earlier years included under "Other States."
[6] Figures represent 1924–48 production only; earlier years included under "Other States."
[7] Early production in New York included with Pennsylvania.
[8] Includes Alaska, 1912–33; Arkansas, 1920; Michigan, 1900–19; Missouri, 1899–1911, 1913–16, 1919–23, 1932–48; New Mexico, 1913, 1919–23; Tennessee, 1916–48, Utah, 1907–11, 1920, 1924–41; Virginia, 1943–48.

TABLE D–11.—*Percentage of total crude petroleum produced in the United States, 1940–49, by principal States*

| State | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 [1] |
|---|---|---|---|---|---|---|---|---|---|---|
| Texas | 36.4 | 36.1 | 34.8 | 39.5 | 44.5 | 44.0 | 43.8 | 44.2 | 44.7 | 40.4 |
| California | 16.6 | 16.4 | 17.9 | 18.9 | 18.6 | 19.1 | 18.2 | 17.9 | 16.8 | 18.1 |
| Louisiana | 7.7 | 8.3 | 8.3 | 8.2 | 7.7 | 7.7 | 8.3 | 8.6 | 9.0 | 10.4 |
| Oklahoma | 11.5 | 11.0 | 10.2 | 8.2 | 7.4 | 8.1 | 7.8 | 7.6 | 7.7 | 8.3 |
| Kansas | 4.9 | 5.9 | 7.0 | 7.0 | 5.9 | 5.6 | 5.6 | 5.7 | 5.5 | 5.5 |
| Illinois | 10.9 | 9.4 | 7.7 | 5.5 | 4.6 | 4.4 | 4.3 | 3.6 | 3.2 | 3.5 |
| New Mexico | 2.9 | 2.8 | 2.3 | 2.6 | 2.4 | 2.2 | 2.1 | 2.2 | 2.4 | 2.6 |
| Wyoming | 1.9 | 2.1 | 2.4 | 2.3 | 2.0 | 2.1 | 2.2 | 2.4 | 2.7 | 2.6 |
| Mississippi | .3 | 1.1 | 2.1 | 1.2 | 1.0 | 1.1 | 1.4 | 1.9 | 2.3 | 2.1 |
| Arkansas | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 |
| Colorado | .1 | .2 | .1 | .2 | .2 | .2 | .7 | .8 | .9 | 1.3 |
| Michigan | 1.5 | 1.2 | 1.6 | 1.4 | 1.1 | 1.0 | 1.0 | .9 | .8 | .9 |
| Pennsylvania | 1.3 | 1.2 | 1.3 | 1.0 | .8 | .7 | .8 | .7 | .6 | .6 |
| Other States | 2.1 | 2.4 | 2.4 | 2.2 | 2.0 | 2.0 | 2.2 | 1.9 | 1.8 | 2.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Preliminary figures.

[1] Other includes Mississippi, Missouri, Tennessee, and Utah in 1935; in 1936, 1937, and 1938 includes Missouri, Tennessee, and Utah; in 1939, 1940, 1941 is Utah only.

Source: U. S. Bureau of Mines.

TABLE D–12.—*Production of crude petroleum in leading fields and districts in the United States, 1948–49, and total production since discovery, in thousands of barrels*

[Oil and Gas Journal]

| Field | State | 1948 | 1949 | Total since discovery [1] |
|---|---|---|---|---|
| East Texas | Texas | 111,829 | 93,589 | 2,679,804 |
| Wilmington | California | 48,583 | 43,655 | 460,880 |
| Panhandle | Texas | 31,687 | 33,165 | 663,099 |
| Coalinga | California | 32,369 | 27,112 | 620,218 |
| Slaughter-Levelland | Texas | 26,821 | 22,822 | 163,130 |
| Ventura Avenue | California | 17,786 | 21,133 | 376,787 |
| Huntington Beach | do | 20,825 | 21,116 | 438,269 |
| Rangely | Colorado | 13,412 | 19,549 | 56,662 |
| Wasson | Texas | 28,884 | 19,278 | 197,563 |
| T-X-L | do | 24,089 | 16,474 | 63,394 |
| Hastings | do | 21,648 | 14,308 | 183,214 |
| Buena Vista | California | 16,610 | 13,962 | 377,976 |
| Bradford-Allegany [2] | Pennsylvania-New York | 14,965 | 13,305 | 586,222 |
| Webster | Texas | 20,768 | 13,144 | 138,782 |
| Midway-Sunset | California | 15,167 | 12,749 | 748,775 |
| Yates | Texas | 18,103 | 11,883 | 361,757 |
| Kettleman-North Dome | California | 12,887 | 11,740 | 361,948 |
| Thompson | Texas | 16,958 | 11,734 | 142,719 |
| Conroe | do | 20,440 | 11,633 | 281,210 |
| Hawkins | do | 17,621 | 11,453 | 107,849 |
| Keystone | do | 14,586 | 11,029 | 76,564 |
| Velma | Oklahoma | 13,225 | 10,134 | 43,128 |
| Fullerton | Texas | 16,011 | 10,069 | 60,802 |
| Goldsmith | do | 11,128 | 9,141 | 102,349 |
| Trapp | Kansas | 10,404 | 8,905 | 114,599 |
| Seeligson | Texas | 12,269 | 8,641 | 67,040 |
| Coles Levee | California | 7,809 | 8,510 | 65,130 |
| Long Beach | do | 8,268 | 8,356 | 743,040 |
| Van | Texas | 12,124 | 8,312 | 203,777 |
| McElroy | do | 10,629 | 8,146 | 193,690 |
| Lake St. John | Louisiana | 8,094 | 8,080 | 29,728 |
| Oklahoma City | Oklahoma | 8,543 | 7,703 | 668,458 |
| Delta Farms | Louisiana | 6,754 | 7,570 | 31,401 |
| Elk Basin | Wyoming-Montana | 8,168 | 7,105 | 48,815 |
| Anahuac | Texas | 10,758 | 7,090 | 94,251 |
| Kern | California | 8,271 | 7,014 | 378,550 |
| Russell Ranch | do | 842 | 6,885 | 7,727 |
| Drinkard | New Mexico | 6,236 | 6,742 | 17,100 |
| Monument | do | 6,902 | 6,488 | 100,345 |
| Coyote | California | 7,395 | 6,485 | 223,302 |
| Talco | Texas | 8,795 | 6,168 | 116,815 |
| North Cowden | do | 8,978 | 6,109 | 81,590 |
| Louden | Illinois | 6,715 | 6,077 | 149,654 |
| Foster | Texas | 6,980 | 6,013 | 57,173 |
| La Gloria | do | 6,656 | 5,908 | 27,219 |
| Erath | Louisiana | 6,252 | 5,886 | 36,634 |
| Santa Maria Valley | California | 7,407 | 5,693 | 97,212 |
| Tinsley | Mississippi | 6,054 | 5,560 | 112,594 |
| Mallalieu | do | 6,141 | 5,524 | 14,099 |
| West Edmond | Oklahoma | 9,322 | 5,478 | 87,964 |
| Santa Fe Springs | California | 5,513 | 5,340 | 528,226 |
| Brookhaven | Mississippi | 5,013 | 5,291 | 15,932 |
| Katy | Texas | 5,020 | 5,271 | 23,925 |
| Old Ocean | do | 5,954 | 5,117 | 54,101 |
| Inglewood | California | 4,416 | 5,101 | 169,994 |
| West Cat Canyon | do | 5,705 | 5,071 | 41,346 |
| West Ranch | Texas | 6,986 | 5,058 | 59,371 |

[1] Includes revisions.
[2] Bureau of Mines data.
Source: U. S. Bureau of Mines.

TABLE D–13.—*Supply and demand for crude petroleum in the United States, 1945–49*

[Thousands of barrels]

| | 1945 | 1946 | 1947 | 1948 | 1948 [1] | 1949 [2] |
|---|---|---|---|---|---|---|
| Production | 1,713,655 | 1,733,939 | 1,856,987 | 2,020,185 | 2,020,185 | 1,840,307 |
| Imports [3] | 74,337 | 86,066 | 97,532 | 129,093 | 129,093 | 154,922 |
| Total new supply | 1,787,992 | 1,820,005 | 1,954,519 | 2,149,278 | 2,149,278 | 1,995,229 |
| Change in stocks [4] | −3,511 | +6,917 | +478 | +25,973 | +25,973 | −3,271 |
| Demand: | | | | | | |
| Domestic crude | 1,717,650 | 1,728,102 | 1,856,479 | 1,998,357 | 1,998,357 | 1,842,540 |
| Foreign crude | 73,853 | 84,986 | 97,562 | 124,948 | 124,948 | 155,960 |
| Total demand | 1,791,503 | 1,813,088 | 1,954,041 | 2,123,305 | 2,123,305 | 1,998,500 |
| Runs to stills: | | | | | | |
| Domestic | 1,645,862 | 1,645,845 | 1,754,987 | 1,907,027 | 1,924,335 | 1,790,906 |
| Foreign | 73,672 | 84,352 | 97,259 | 124,014 | 124,014 | 154,613 |
| Exports [5] | 32,998 | 42,436 | 46,355 | 39,736 | 39,736 | 33,069 |
| Transfers to fuel oil: | | | | | | |
| Distillate | 3,047 | 3,123 | 3,263 | 3,543 | 3,543 | 2,701 |
| Residual | 20,727 | 23,142 | 27,091 | 23,847 | 6,699 | 4,750 |
| Other fuel and losses | 15,197 | 14,190 | 25,086 | 23,138 | 24,978 | 12,461 |
| Total demand | 1,791,503 | 1,813,088 | 1,954,041 | 2,123,305 | 2,123,305 | 1,998,500 |

[1] Includes California data on a new basis to compare with 1949.
[2] Preliminary figures.
[3] Bureau of Mines data.
[4] Inclusive of heavy crude in California, 1945–48; separation discontinued in 1949.
[5] Bureau of Mines, 1945–46; U. S. Department of Commerce, 1947–49.

Source: U. S. Bureau of Mines.

Though both production and refinery capacity have increased with the years and stocks on hand have fluctuated from month to month the general trend of oil stocks, crude and products has been downward until 1948. It stood generally near 250 days' supply in the early 1930's but below 100 days' supply since 1943.

FIGURE D–4.

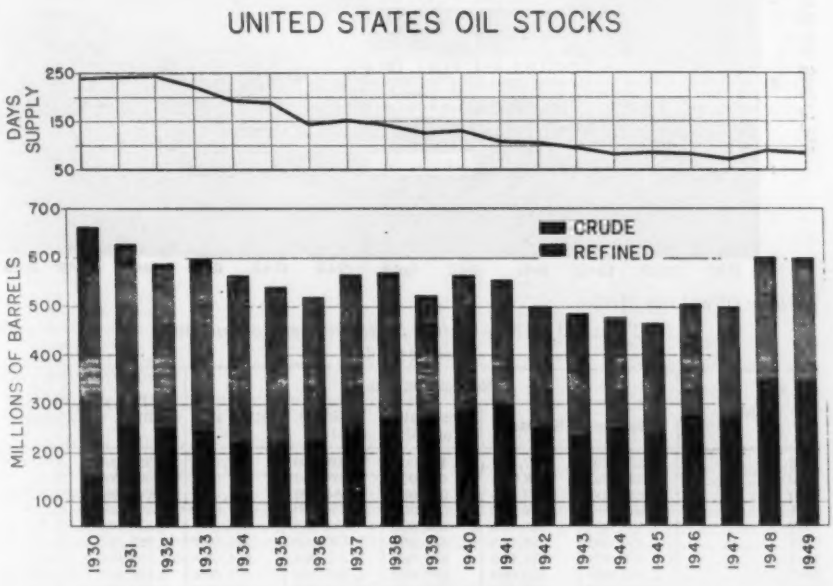


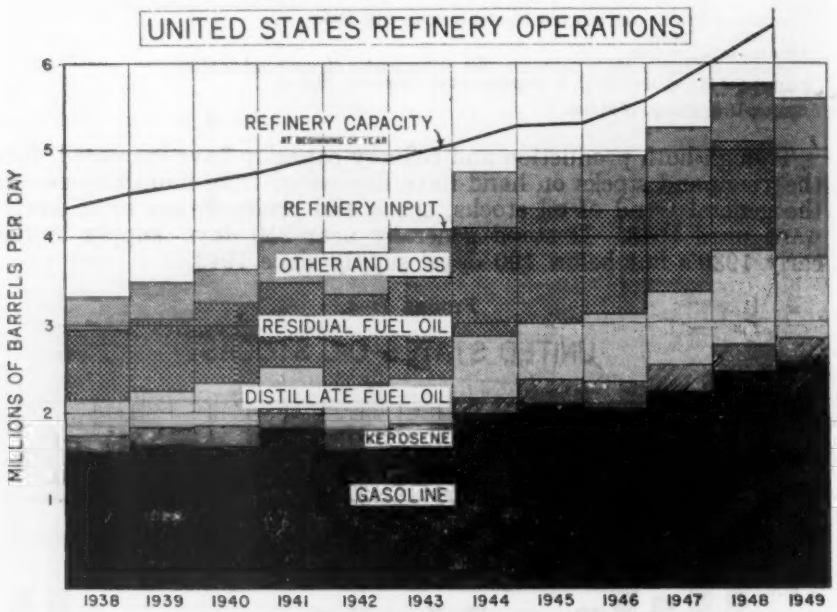
TABLE D–14.—*United States oil stocks*

[Thousands of barrels]

| Year | Crude oil | Natural gasoline | Refined products | Total refined oils | Grand total | Days supply |
|---|---|---|---|---|---|---|
| 1930 | 512, 230 | 2, 377 | 150, 890 | 153, 267 | 665, 497 | 240 |
| 1931 | 370, 194 | 2, 825 | 258, 879 | 261, 704 | 631, 898 | 242 |
| 1932 | 339, 875 | 3, 203 | 249, 116 | 252, 319 | 592, 194 | 244 |
| 1933 | 354, 223 | 3, 680 | 244, 295 | 247, 975 | 602, 198 | 225 |
| 1934 | 337, 254 | 4, 216 | 222, 678 | 226, 894 | 564, 148 | 197 |
| 1935 | 314, 631 | 3, 698 | 223, 371 | 227, 069 | 541, 700 | 166 |
| 1936 | 288, 579 | 4, 055 | 226, 595 | 230, 650 | 519, 229 | 146 |
| 1937 | 320, 338 | 4, 758 | 239, 901 | 244, 659 | 564, 997 | 155 |
| 1938 | 290, 632 | 4, 830 | 272, 241 | 277, 071 | 567, 703 | 147 |
| 1939 | 253, 308 | 4, 421 | 268, 109 | 272, 530 | 525, 838 | 132 |
| 1940 | 276, 615 | 5, 704 | 280, 958 | 286, 662 | 563, 277 | 137 |
| 1941 | 257, 678 | 4, 437 | 294, 310 | 298, 747 | 556, 425 | 118 |
| 1942 | 245, 754 | 4, 632 | 247, 554 | 252, 186 | 497, 940 | 114 |
| 1943 | 249, 404 | 4, 541 | 229, 362 | 233, 903 | 483, 307 | 99 |
| 1944 | 226, 770 | 4, 451 | 245, 868 | 250, 319 | 477, 089 | 86 |
| 1945 | 223, 259 | 4, 322 | 235, 998 | 240, 320 | 463, 579 | 88 |
| 1946 | 230, 176 | 4, 981 | 271, 937 | 276, 918 | 507, 094 | 85 |
| 1947 | 230, 654 | 4, 296 | 267, 103 | 271, 399 | 502, 053 | 75 |
| 1948 | 256, 254 | 5, 579 | 345, 469 | 351, 048 | 607, 302 | 92 |
| 1949 | 253, 356 | 6, 831 | 342, 782 | 349, 613 | 602, 969 | 87 |

Source: Department of the Interior, Oil and Gas Division, February 1950.

FIGURE D–5.—UNITED STATES REFINERY OPERATIONS.




Source: Oil and Gas Division.

TABLE D–15.—*United States refinery operations*

[Barrels per day]

| Year | Refinery output | | | | | Refinery input | Refinery capacity |
|---|---|---|---|---|---|---|---|
| | Gasoline | Kerosene | Distillate fuel oil | Residual fuel oil | Other and loss | | |
| 1938 | 1, 523, 000 | 177, 000 | 416, 000 | 808, 000 | 377, 000 | 3, 301, 000 | 4, 351, 000 |
| 1939 | 1, 634, 000 | 188, 000 | 443, 000 | 838, 000 | 397, 000 | 3, 500, 000 | 4, 509, 000 |
| 1940 | 1, 632, 000 | 202, 000 | 501, 000 | 864, 000 | 445, 000 | 3, 644, 000 | 4, 629, 000 |
| 1941 | 1, 839, 000 | 199, 000 | 518, 000 | 938, 000 | 497, 000 | 3, 992, 000 | 4, 719, 000 |
| 1942 | 1, 608, 000 | 185, 000 | 539, 000 | 983, 000 | 495, 000 | 3, 810, 000 | 4, 957, 000 |
| 1943 | 1, 623, 000 | 198, 000 | 579, 000 | 1, 143, 000 | 541, 000 | 4, 085, 000 | 4, 902, 000 |
| 1944 | 1, 975, 000 | 214, 000 | 653, 000 | 1, 261, 000 | 634, 000 | 4, 735, 000 | 5, 093, 000 |
| 1945 | 2, 122, 000 | 222, 000 | 683, 000 | 1, 286, 000 | 591, 000 | 4, 904, 000 | 5, 301, 000 |
| 1946 | 2, 050, 000 | 286, 000 | 789, 000 | 1, 182, 000 | 605, 000 | 4, 912, 000 | 5, 315, 000 |
| 1947 | 2, 232, 000 | 302, 000 | 855, 000 | 1, 227, 000 | 651, 000 | 5, 268, 000 | 5, 569, 000 |
| 1948 | 2, 448, 000 | 333, 000 | 1, 040, 000 | 1, 274, 000 | 662, 000 | 5, 756, 000 | 6, 034, 000 |
| 1949 | 2, 573, 000 | 272, 000 | 925, 000 | 1, 152, 000 | 657, 000 | 5, 579, 000 | 6, 439, 000 |

Source: Department of the Interior, Oil and Gas Division, February 1950.

TABLE D–16.—*Salient statistics of the major refined petroleum products in the United States, 1944–49*

[Thousands of barrels]

| Product | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 [1] |
|---|---|---|---|---|---|---|
| Motor fuel: | | | | | | |
| Production | 739,340 | 798,194 | 776,583 | 839,998 | 921,923 | 961,791 |
| Imports | 3,148 | 1,807 | 1 | 358 | 302 | |
| Exports | 100,537 | 88,059 | 45,334 | 47,449 | 37,302 | 39,474 |
| Stocks, end of year | 78,073 | 93,682 | 89,515 | 87,407 | 101,060 | 110,417 |
| Domestic demand | 632,482 | 696,333 | 735,417 | 795,015 | 871,270 | 912,960 |
| Kerosene: | | | | | | |
| Production | 78,344 | 81,024 | 104,385 | 110,412 | 121,914 | 102,152 |
| Imports | 147 | | | | 135 | |
| Exports | 4,888 | 6,180 | 8,637 | 7,252 | [2] 395 | 2,532 |
| Stocks, end of year | 11,150 | 10,421 | 17,081 | 17,722 | 23,941 | 20,888 |
| Domestic demand | 71,812 | 75,573 | 89,088 | 102,519 | 112,220 | 102,673 |
| Distillate fuel oil: | | | | | | |
| Production | 239,152 | 249,224 | 287,896 | 312,173 | 380,700 | 339,530 |
| Transfers from crude | 3,242 | 3,047 | 3,123 | 3,263 | 3,543 | 2,701 |
| Imports | 7,022 | 4,754 | 5,204 | 4,175 | 2,546 | 1,720 |
| Exports | 43,491 | 33,496 | 29,487 | 29,877 | 21,293 | 12,189 |
| Stocks, end of year | 38,333 | 35,778 | 59,620 | 51,081 | [6] 71,429 | 75,207 |
| Domestic demand | 209,320 | 226,084 | 242,894 | 298,273 | 340,576 | 327,984 |
| Residual fuel oil: | | | | | | |
| Production | 461,455 | 469,492 | 431,364 | 447,795 | 466,317 | 424,989 |
| Transfers from crude | 28,515 | 20,727 | 23,142 | 27,091 | 23,847 | 4,750 |
| Imports | 36,485 | 31,648 | 44,647 | 54,244 | 53,269 | 74,555 |
| Exports | 12,536 | 11,669 | 9,188 | 10,623 | 13,011 | 12,641 |
| Stocks, end of year | 50,383 | 37,158 | 47,094 | 47,091 | 64,021 | 60,193 |
| Domestic demand | 512,020 | 523,423 | 480,029 | 518,510 | 500,543 | 495,321 |
| Lubricating oil: | | | | | | |
| Production | 41,106 | 41,867 | 45,645 | 51,765 | 51,416 | 45,389 |
| Imports | | | 88 | 38 | 101 | |
| Exports | 8,709 | 6,575 | 11,051 | 14,262 | 13,392 | 13,005 |
| Stocks, end of year | 7,815 | 7,773 | 7,564 | [5] 7,701 | 9,843 | 9,219 |
| Domestic demand | 32,363 | 35,334 | 34,891 | 36,481 | 36,983 | 33,008 |
| Wax (1 barrel=280 pounds): | | | | | | |
| Production | 2,883 | 2,921 | 3,003 | 3,624 | 3,515 | 3,208 |
| Imports | | 6 | 1 | 4 | 27 | |
| Exports | 580 | 566 | 718 | 1,107 | 994 | 1,030 |
| Stocks, end of year | 335 | 293 | 308 | 351 | 551 | 473 |
| Domestic demand | 2,261 | 2,403 | 2,271 | 2,478 | 2,348 | 2,256 |
| Coke (5 barrels=1 short ton): | | | | | | |
| Production | 9,017 | 10,115 | 10,621 | 12,077 | 14,494 | 16,959 |
| Exports | 1,045 | 1,046 | 1,933 | 2,102 | 2,521 | 2,480 |
| Stocks, end of year | 936 | 791 | 450 | 343 | 646 | 698 |
| Domestic demand | 8,327 | 9,214 | 9,029 | 10,082 | 11,670 | 14,427 |
| Asphalt (5.5 barrels=1 short ton): | | | | | | |
| Production | 38,479 | 39,196 | 44,911 | 49,286 | 51,919 | 49,007 |
| Imports | 695 | 809 | 691 | 1,159 | 1,557 | 1,184 |
| Exports | 699 | 1,289 | 2,298 | 3,262 | 1,628 | 1,552 |
| Stocks, end of year | 3,444 | 3,810 | 3,861 | [5] 3,771 | 5,657 | 4,918 |
| Domestic demand | 38,129 | 38,350 | 43,253 | 47,023 | 49,962 | 49,378 |
| Still gas (1 barrel=3,600 cubic feet): Production | 102,239 | 103,458 | 88,136 | 85,564 | 81,159 | 82,621 |
| Road oil: | | | | | | |
| Production | 1,556 | 2,686 | 6,175 | 7,074 | 7,915 | 7,691 |
| Stocks, end of year | 189 | 370 | 606 | 613 | 501 | 366 |
| Domestic demand | 1,560 | 2,505 | 5,939 | 7,067 | 8,027 | 7,826 |
| Other finished products: | | | | | | |
| Production: | | | | | | |
| LR-gases [3] | 8,563 | 9,292 | 15,440 | 18,670 | 23,676 | 23,144 |
| Other | 9,873 | 9,788 | 7,099 | 5,678 | 6,929 | 5,296 |
| Transfers of LP-gases [4] from natural gasoline | 16,796 | 19,978 | 25,515 | 35,310 | 42,991 | 45,725 |
| Exports | 893 | 1,105 | 2,041 | 2,188 | 1,302 | 1,498 |
| Stocks, end of year | 965 | 1,061 | 1,120 | [5] 1,027 | 1,307 | 1,262 |
| Domestic demand | 34,108 | 37,857 | 45,954 | 57,483 | 72,014 | 72,712 |
| Unfinished gasoline: | | | | | | |
| Rerun (net) | [5] 1,745 | 4,892 | 108 | [5] 984 | 917 | 418 |
| Stocks, end of year | 13,208 | 8,316 | 8,208 | 9,192 | 8,275 | 7,857 |
| Other unfinished oils: | | | | | | |
| Rerun (net) | [5] 2,584 | 5,727 | 1,615 | 1,227 | 513 | 8,068 |
| Transfers of cycle products | 1,821 | 848 | 1,261 | 1,704 | 1,114 | 2,470 |
| Imports | 9 | 258 | 978 | 1,879 | 60,885 | 1,750 |
| Stocks, end of year | 45,488 | 40,867 | 41,491 | 43,847 | 2,768 | 58,037 |
| Shortage | 13,177 | 6,954 | 1,695 | 4,222 | 2,636 | 585 |

[1] Subject to revision.

[2] Figure on new basis that excludes distributors' stocks in California and is comparable with 1948 total. Figures for 1947 on the old basis and comparable with preceding years are as follows, in thousands of barrels: Lubricating oil, 8,624; asphalt, 4,021; and other finished products, 1,107.

[3] Liquefied refinery gases.

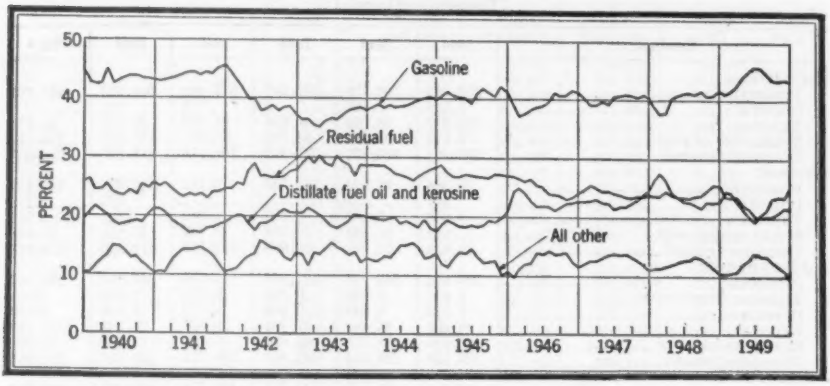
[4] Liquefied petroleum gases.

[5] Negative quantity; represents net excess of unfinished oils produced over unfinished oils rerun.

[6] Figures on new basis for comparison with 1949 figures for 1948 on the old basis and comparable with preceding year's are as follows, in thousands of barrels: kerosene, 24,056; distillate, 76,001; residue 76,970; and other unfinished, 46,362.

Source: U. S. Bureau of Mines.

FIGURE D–6.—YIELDS OF PRINCIPAL PRODUCTS FROM CRUDE OIL RUN TO STILLS IN THE UNITED STATES, 1940–49, BY MONTHS.




Source: Minerals Yearbook, 1949.

TABLE D–17.—*Percentage yields of refined petroleum products in the United States, 1940–49*

| Product | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1948 [1] | 1949 [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Finished products: | | | | | | | | | | | |
| Gasoline: | | | | | | | | | | | |
| Cracked | 22.7 | 24.4 | 22.3 | 22.0 | 23.2 | 23.3 | 22.5 | [3] | [3] | [3] | [3] |
| Straight run | 20.4 | 19.8 | 17.5 | 15.1 | 16.2 | 17.6 | 17.1 | [3] | [3] | [3] | [3] |
| Total gasoline | 43.1 | 44.2 | 39.8 | 37.1 | 39.4 | 40.9 | 39.6 | 40.2 | 40.3 | 40.1 | 43.7 |
| Kerosene | 5.7 | 5.2 | 5.1 | 5.0 | 4.7 | 4.7 | 6.0 | 6.0 | 6.0 | 6.0 | 5.2 |
| Distillate fuel oil | 14.2 | 13.4 | 14.7 | 14.8 | 14.4 | 14.5 | 16.6 | 16.8 | 18.7 | 18.5 | 17.4 |
| Residual fuel oil | 24.4 | 24.3 | 26.9 | 29.2 | 27.7 | 27.3 | 24.9 | 24.1 | 23.0 | 23.5 | 21.7 |
| Lubricating oil | 2.8 | 2.8 | 2.9 | 2.7 | 2.5 | 2.4 | 2.7 | 2.8 | 2.5 | 2.5 | 2.3 |
| Wax | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 |
| Coke | .6 | .6 | .5 | .5 | .5 | .6 | .6 | .7 | .7 | .7 | .9 |
| Asphalt | 2.3 | 2.6 | 2.6 | 2.6 | 2.3 | 2.3 | 2.6 | 2.7 | 2.6 | 2.5 | 2.5 |
| Road oil | .6 | .6 | .6 | .2 | .1 | .2 | .4 | .4 | .4 | .4 | .4 |
| Still gas | 5.5 | 5.9 | 5.9 | 6.1 | 6.1 | 6.0 | 5.1 | 4.6 | 4.0 | 4.0 | 4.2 |
| Other | .3 | .4 | .6 | .7 | 1.1 | 1.1 | 1.3 | 1.3 | 1.5 | 1.5 | 1.5 |
| Unfinished products: | | | | | | | | | | | |
| Gasoline | .1 | .1 | .1 | [4] | .1 | [5] 3 | [6] [5] | [6] | [6] | [6] | [6] |
| Other | [5] 3 | [5] 2 | [5] 3 | .2 | .1 | [5] 3 | [5] 1 | [7] | [7] | [7] | [7] |
| Shortage | .6 | [5] 1 | .4 | .7 | .8 | .4 | .1 | .2 | .1 | .1 | ------ |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Yields computed on the new basis for California to compare with 1949.
[2] Preliminary figures.
[3] Not separated after 1946.
[4] Less than 0.1 percent.
[5] Negative percentage; represents excess rerun over produced.
[6] Added to finished gasoline production in computing yields after 1946.
[7] Added to crude in computing yields after 1946.

Source: U. S. Bureau of Mines.

## *Natural Gas*

Natural gas production in considerable part is a byproduct or a joint product of petroleum production. In 1948, of a total production of 7,178,777 million cubic feet, 4,588,547 million feet came from gas wells and 2,590,230 million from oil wells (table D–19). Gross production by States (table D–20) has more than doubled since before the war, with Texas again producing nearly half the total. Other producing States are largely those in which petroleum production is significant; i. e., Louisiana, California, Oklahoma, Kansas, New Mexico, and West Virginia (tables D–19, D–20, D–21).

The marketed production has increased from less than 800 billion cubic feet in the early 1920's to approximately 5,750 billion cubic feet in 1949. One-sixth of the gross production is used for repressuring. Almost again that much constitutes losses and wastes. That leaves gross marketed production. Another fifth of the latter is used in the field or lost, leaving a net marketed production in 1948 of 3,952 billion cubic feet out of gross production of 7,179 billion cubic feet—or somewhat more than one-half. More than three-fourths of the net marketed production was sold to consumers.

Sixty-one percent of the total production in 1948 was treated for recovery of byproducts. The 4,400 billions of cubic feet treated yielded 2,951 millions of gallons of natural gasoline and 2,181 millions of gallons of liquefied petroleum gas as well as nearly 1 billion gallons of other products (table D–22).

TABLE D–18.—*Marketed production—Natural gas*

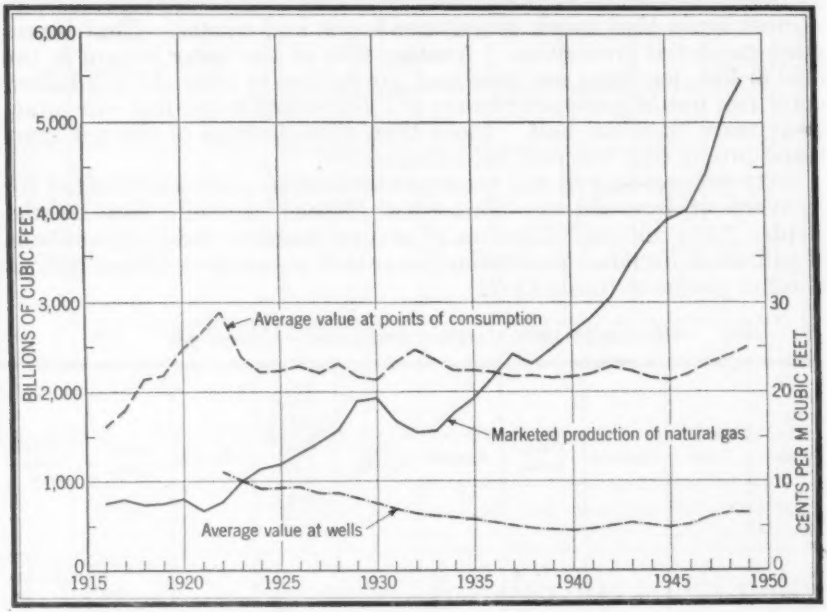
| Year | Texas | Louisana | Oklahoma | Kansas | New Mexico | Total West Virginia, Pennsylvania, Ohio, Kentucky, New York | California | Other States | United States total |
|---|---|---|---|---|---|---|---|---|---|
| 1906 | (1) | [1] 1 | 4 | 69 | ..... | 306 | ..... | 9 | 389 |
| 1907 | (1) | [1] 1 | 5 | 77 | ..... | 315 | ..... | 9 | 407 |
| 1908 | (1) | [1] 2 | 12 | 81 | ..... | 295 | ..... | 12 | 402 |
| 1909 | (1) | [1] 4 | 28 | 75 | ..... | 355 | 2 | 17 | 481 |
| 1910 | (1) | [1] 8 | 51 | 59 | ..... | 373 | 3 | 15 | 509 |
| 1911 | 5 | [2] 10 | 67 | 39 | ..... | 372 | 6 | 14 | 513 |
| 1912 | 7 | [2] 14 | 74 | 28 | ..... | 418 | 9 | 12 | 562 |
| 1913 | 12 | [2] 27 | 75 | 23 | ..... | 425 | 11 | 9 | 582 |
| 1914 | 13 | [2] 27 | 78 | 23 | ..... | 426 | 18 | 7 | 592 |
| 1915 | 13 | 26 | 88 | 28 | ..... | 447 | 22 | 5 | 629 |
| 1916 | 16 | 32 | 123 | 32 | ..... | 510 | 32 | 8 | 753 |
| 1917 | 17 | 31 | 137 | 25 | ..... | 522 | 49 | 14 | 795 |
| 1918 | 13 | 36 | 124 | 28 | ..... | 462 | 40 | 18 | 721 |
| 1919 | 25 | 47 | 164 | 16 | ..... | 421 | 56 | 17 | 746 |
| 1920 | 37 | 58 | 155 | 21 | ..... | 436 | 66 | 25 | 798 |
| 1921 | 44 | 58 | 124 | 16 | ..... | 320 | 76 | 24 | 662 |
| 1922 | 48 | 70 | 141 | 20 | (3) | 361 | 85 | 38 | 763 |
| 1923 | 75 | 112 | 203 | 31 | (3) | 388 | 131 | 67 | 1,007 |
| 1924 | 107 | 161 | 214 | 26 | ..... | 355 | 190 | 89 | 1,142 |
| 1925 | 135 | 153 | 249 | 27 | (3) | 342 | 188 | 95 | 1,189 |
| 1926 | 175 | 157 | 287 | 38 | 1 | 352 | 205 | 98 | 1,313 |
| 1927 | 254 | 187 | 327 | 43 | 1 | 335 | 212 | 86 | 1,445 |
| 1928 | 302 | 228 | 321 | 46 | 1 | 341 | 246 | 83 | 1,568 |
| 1929 | 465 | 261 | 358 | 39 | 3 | 363 | 342 | 87 | 1,918 |
| 1930 | 518 | 278 | 348 | 38 | 10 | 334 | 335 | 82 | 1,943 |
| 1931 | 465 | 224 | 294 | 39 | 19 | 291 | 306 | 78 | 1,686 |
| 1932 | 457 | 202 | 255 | 41 | 18 | 251 | 263 | 69 | 1,556 |
| 1933 | 476 | 198 | 246 | 41 | 19 | 250 | 260 | 65 | 1,555 |
| 1934 | 603 | 226 | 254 | 47 | 24 | 285 | 268 | 64 | 1,771 |
| 1935 | 642 | 250 | 274 | 57 | 28 | 308 | 284 | 74 | 1,917 |
| 1936 | 735 | 290 | 280 | 69 | 34 | 352 | 320 | 88 | 2,168 |
| 1937 | 855 | 315 | 296 | 84 | 46 | 385 | 330 | 97 | 2,408 |
| 1938 | 882 | 284 | 263 | 75 | 51 | 332 | 315 | 94 | 2,296 |
| 1939 | 979 | 294 | 251 | 81 | 60 | 367 | 348 | 97 | 2,477 |
| 1940 | 1,064 | 343 | 258 | 90 | 64 | 385 | 352 | 104 | 2,660 |
| 1941 | 1,086 | 404 | 234 | 111 | 65 | 422 | 375 | 116 | 2,813 |
| 1942 | 1,170 | 448 | 270 | 113 | 78 | 442 | 404 | 128 | 3,053 |
| 1943 | 1,324 | 505 | 285 | 134 | 87 | 470 | 458 | 152 | 3,415 |
| 1944 | 1,525 | 535 | 311 | 158 | 88 | 427 | 502 | 165 | 3,711 |
| 1945 | 1,711 | 543 | 358 | 146 | 105 | 383 | 502 | 171 | 3,919 |
| 1946 | 1,776 | 525 | 381 | 166 | 119 | 409 | 488 | 167 | 4,031 |
| 1947 | 1,993 | 581 | 419 | 209 | 143 | 454 | 561 | 222 | 4,582 |
| 1948 | 2,290 | 686 | 481 | 245 | 195 | 432 | 571 | 248 | 5,148 |

[1] Alabama and Texas included with Louisiana.
[2] Includes Alabama.
[3] With other States.

Source: Bureau of Mines.

FIGURE D–7.

PRODUCTION AND VALUE OF NATURAL GAS IN THE UNITED STATES, 1916-49.




Source: U. S. Bureau of Mines.

TABLE D–19.—*Production and disposition of natural gas in the United States, 1935–49*

[Millions of cubic feet]

OLD BASIS

| Year | Production | | | | | Disposition | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross [1] | | | Repressuring | Net | Losses and waste [1] | Marketed production | Field use | Net change in underground storage | Lost in transmission | Net marketed production |
| | Gas wells | Oil wells | Total | | | | | | | | |
| 1935 | 1,493,005 | 1,005,000 | 2,498,005 | 90,290 | 2,407,715 | 479,826 | 1,927,889 | 580,414 | 11,294 | | 1,336,181 |
| 1936 | 1,483,595 | 1,161,240 | 2,644,835 | 73,507 | 2,571,328 | 392,528 | 2,178,800 | 618,468 | 10,998 | | 1,549,334 |
| 1937 | 1,613,780 | 1,325,630 | 2,939,410 | 84,925 | 2,854,485 | 433,159 | 2,421,326 | 651,320 | 13,706 | | 1,756,300 |
| 1938 | 1,566,975 | 1,494,225 | 3,061,200 | 101,551 | 2,959,649 | 649,106 | 2,310,543 | 659,203 | 14,981 | | 1,636,359 |
| 1939 | 1,832,820 | 1,500,680 | 3,333,500 | 171,401 | 3,162,099 | 677,311 | 2,484,788 | 680,884 | 8,032 | | 1,795,872 |
| 1940 | 2,095,180 | 1,598,920 | 3,694,100 | 362,916 | 3,331,184 | 655,967 | 2,675,217 | 711,861 | 14,995 | | 1,948,361 |
| 1941 | 2,490,590 | 1,612,910 | 4,103,500 | 644,379 | 3,459,121 | 630,212 | 2,828,909 | 686,158 | 16,251 | | 2,126,500 |
| 1942 | 2,885,090 | 1,568,810 | 4,453,900 | 752,619 | 3,701,281 | 626,782 | 3,074,499 | 721,063 | 21,024 | | 2,332,412 |
| 1943 | 3,226,780 | 1,933,780 | 5,160,560 | 824,803 | 4,335,757 | 902,115 | 3,433,642 | 780,986 | 18,953 | | 2,633,703 |
| 1944 | 3,649,830 | 1,964,390 | 5,614,220 | 882,979 | 4,731,241 | 1,010,285 | 3,720,956 | 855,180 | 9,917 | | 2,855,859 |
| 1945 | 3,887,727 | 2,014,453 | 5,902,180 | 1,061,951 | 4,840,229 | 896,208 | 3,944,021 | 916,952 | 25,335 | | 3,001,734 |
| 1946 | 3,807,500 | 2,382,700 | 6,190,200 | 1,038,242 | 5,151,958 | 1,102,033 | 4,049,925 | 897,809 | 19,320 | | 3,132,796 |
| 1947 | 3,769,768 | 2,963,462 | 6,733,230 | 1,083,119 | 5,650,111 | 1,195,745 | 4,454,366 | 933,761 | 9,673 | | 3,510,932 |
| 1948 | 4,588,547 | 2,590,230 | 7,178,777 | 1,220,579 | 5,958,198 | 936,974 | 5,021,224 | 1,021,513 | 47,761 | | 3,951,950 |

NEW BASIS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1947 | 3,769,768 | 2,963,462 | 6,733,230 | 1,083,119 | 5,650,111 | 1,067,938 | 4,582,173 | 933,761 | 9,673 | 127,807 | 3,510,932 |
| 1948 | 4,588,547 | 2,590,230 | 7,178,777 | 1,220,579 | 5,958,198 | 810,178 | 5,148,020 | 1,021,513 | 5,737 | 126,796 | 3,951,950 |
| 1949 | 4,986,127 | 2,560,699 | 7,546,825 | 1,273,205 | 6,273,620 | 853,864 | 5,419,736 | 1,061,158 | 65,683 | 138,496 | 4,154,399 |

[1] Includes gas (mostly residue gas) blown to the air but does not include direct waste on producing properties, except where data are available.

Source: U. S. Bureau of Mines; 1949 net production and net change in underground storage from AGA Natural Gas Reserves Committee Report.

TABLE D–20.—*Estimated gross production of natural gas, by State, 1937–48*

[Millions of cubic feet]

| State | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| United States | 2,939,410 | 3,061,200 | 3,333,500 | 3,694,100 | 4,103,500 | 4,453,900 | 5,160,560 | 5,614,220 | 5,902,180 | 6,190,200 | 6,733,230 | 7,178,777 |
| Arkansas | 12,500 | 24,200 | 24,000 | 41,000 | 45,000 | 49,000 | 59,000 | 82,000 | 76,000 | 72,000 | 74,000 | 73,710 |
| California | 400,000 | 432,000 | 430,000 | 430,000 | 460,000 | 472,600 | 555,000 | 617,000 | 634,000 | 654,000 | 704,300 | 748,700 |
| Colorado | 3,300 | 2,000 | 2,300 | 2,900 | 3,300 | 5,100 | 7,000 | 6,000 | 6,000 | 10,110 | 11,300 | 11,500 |
| Illinois | 1,200 | 18,000 | 63,000 | 131,000 | 102,400 | 86,500 | 64,000 | 55,000 | 50,000 | 60,000 | 48,400 | 40,000 |
| Indiana | 1,800 | 1,500 | 1,400 | 3,200 | 3,500 | 3,690 | 2,400 | 2,100 | 2,500 | 2,020 | 2,090 | 1,700 |
| Kansas | 105,700 | 116,000 | 110,000 | 115,000 | 123,000 | 125,000 | 150,000 | 166,000 | 153,000 | 209,910 | 243,500 | 278,000 |
| Kentucky | 60,500 | 51,300 | 53,000 | 59,000 | 76,200 | 87,700 | 102,000 | 103,000 | 94,000 | 80,000 | 98,010 | 74,330 |
| Louisiana | 360,000 | 360,800 | 413,000 | 435,000 | 574,800 | 669,100 | 700,000 | 800,000 | 798,000 | 769,000 | 852,600 | 973,000 |
| Michigan | 9,400 | 10,600 | 11,400 | 14,000 | 15,100 | 17,909 | 23,000 | 25,000 | 25,000 | 27,100 | 38,300 | 24,050 |
| Mississippi | 14,300 | 14,300 | 15,300 | 6,800 | 5,040 | 3,800 | 2,800 | 2,700 | 8,650 | 22,700 | 65,980 | 96,000 |
| Missouri | 470 | 1,500 | 650 | 400 | 210 | 110 | 140 | 170 | 100 | 43 | 38 | 27 |
| Montana | 25,500 | 21,700 | 24,000 | 27,200 | 28,500 | 31,500 | 32,000 | 33,000 | 32,500 | 33,100 | 35,000 | 38,710 |
| New Mexico | 72,000 | 168,000 | 145,000 | 126,000 | 132,700 | 154,800 | 166,000 | 134,000 | 140,000 | 189,300 | 236,160 | 238,730 |
| New York | 22,000 | 41,000 | 31,000 | 15,200 | 12,500 | 10,800 | 9,400 | 7,700 | 10,400 | 6,530 | 4,730 | 4,800 |
| Ohio | 45,500 | 39,000 | 44,000 | 50,000 | 51,200 | 54,500 | 63,000 | 57,000 | 55,000 | 61,300 | 72,860 | 68,650 |
| Oklahoma | 440,000 | 330,000 | 310,000 | 310,000 | 275,400 | 302,600 | 342,000 | 365,000 | 426,000 | 590,000 | 649,680 | 674,320 |
| Pennsylvania | 120,000 | 86,200 | 103,500 | 102,000 | 105,000 | 104,900 | 103,000 | 100,000 | 90,000 | 93,200 | 92,070 | 87,670 |
| Texas | 1,040,000 | 1,150,000 | 1,330,000 | 1,575,000 | 1,817,000 | 1,990,900 | 2,480,000 | 2,797,000 | 3,060,000 | 3,054,900 | 3,242,000 | 3,450,000 |
| Utah | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | 4,320 | 6,040 | 6,650 |
| West Virginia | 163,000 | 150,000 | 172,000 | 205,000 | 223,300 | 231,500 | 243,000 | 204,000 | 182,000 | 200,500 | 197,810 | 208,000 |
| Wyoming | 39,600 | 38,400 | 44,700 | 40,000 | 43,600 | 46,500 | 52,000 | 51,000 | 52,000 | 49,700 | 57,740 | 79,280 |
| Other States | 2,640 | 4,700 | 5,250 | 5,400 | 5,750 | 5,400 | 4,820 | 6,550 | 7,030 | 467 | 622 | 950 |

[1] Included in other States.

NOTE.—Includes gas (mostly residue gas) blown to the air, but does not include direct waste on producing properties, except where data are available.
Source: U. S. Bureau of Mines.

TABLE D–21.—*Estimated net production of natural gas, by State, 1937–48*

[Millions of cubic feet]

| State | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| United States | 2, 854, 485 | 2, 959, 649 | 3, 162, 099 | 3, 331, 184 | 3, 459, 121 | 3, 701, 281 | 4, 335, 757 | 4, 731, 241 | 4, 840, 229 | 5, 151, 958 | 5, 650, 111 | 5, 958, 198 |
| Arkansas | 12, 280 | 24, 092 | 23, 048 | 40, 140 | 44, 219 | 41, 057 | 50, 225 | 71, 480 | 64, 600 | 60, 990 | 62, 110 | 62, 710 |
| California | 365, 880 | 392, 000 | 407, 513 | 417, 855 | 439, 000 | 430, 438 | 481, 725 | 532, 000 | 531, 276 | 519, 332 | 568, 937 | 581, 140 |
| Colorado | 3, 300 | 2, 000 | 2, 300 | 2, 900 | 3, 300 | 5, 100 | 6, 727 | 5, 547 | 6, 000 | 9, 610 | 11, 000 | 11, 129 |
| Illinois | 1, 200 | 17, 500 | 62, 603 | 130, 251 | 100, 442 | 84, 242 | 58, 134 | 46, 500 | 42, 583 | 52, 000 | 43, 200 | 35, 620 |
| Indiana | 1, 799 | 1, 494 | 1, 400 | 3, 200 | 3, 500 | 3, 471 | 1, 901 | 1, 426 | 1, 936 | 1, 398 | 890 | 565 |
| Kansas | 104, 440 | 114, 345 | 108, 564 | 112, 183 | 120, 655 | 121, 251 | 147, 901 | 163, 794 | 150, 968 | 207, 992 | 241, 686 | 275, 087 |
| Kentucky | 59, 500 | 50, 500 | 52, 792 | 58, 790 | 75, 720 | 87, 141 | 101, 375 | 102, 300 | 93, 299 | 79, 171 | 96, 519 | 73, 097 |
| Louisiana | 356, 078 | 354, 800 | 403, 660 | 414, 000 | 518, 792 | 589, 179 | 608, 856 | 683, 229 | 666, 188 | 617, 631 | 687, 666 | 771, 293 |
| Michigan | 9, 400 | 10, 600 | 11, 400 | 14, 000 | 14, 359 | 17, 900 | 23, 000 | 25, 000 | 25, 000 | 27, 100 | 38, 167 | 21, 164 |
| Mississippi | 14, 300 | 14, 300 | 15, 300 | 6, 800 | 5, 040 | 3, 800 | 2, 800 | 2, 700 | 8, 650 | 21, 218 | 55, 167 | 65, 390 |
| Missouri | 470 | 1, 500 | 650 | 400 | 210 | 110 | 140 | 170 | 100 | 43 | 38 | 27 |
| Montana | 25, 305 | 21, 512 | 23, 977 | 27, 200 | 28, 500 | 31, 490 | 31, 965 | 32, 975 | 32, 500 | 32, 968 | 34, 730 | 38, 298 |
| New Mexico | 70, 913 | 167, 548 | 144, 969 | 125, 969 | 132, 143 | 153, 512 | 162, 796 | 131, 140 | 132, 379 | 186, 705 | 232, 419 | 236, 584 |
| New York | 22, 000 | 41, 000 | 30, 915 | 15, 188 | 12, 486 | 10, 800 | 9, 400 | 7, 640 | 10, 400 | 6, 530 | 4, 600 | 4, 707 |
| Ohio | 45, 494 | 38, 910 | 40, 005 | 46, 950 | 47, 987 | 51, 176 | 59, 505 | 56, 994 | 54, 990 | 61, 290 | 68, 946 | 65, 627 |
| Oklahoma | 415, 376 | 311, 344 | 296, 104 | 295, 537 | 263, 980 | 289, 143 | 327, 980 | 349, 081 | 410, 027 | 574, 409 | 633, 180 | 653, 536 |
| Pennsylvania | 119, 707 | 85, 637 | 102, 767 | 101, 174 | 104, 079 | 103, 903 | 101, 665 | 98, 564 | 87, 767 | 93, 136 | 92, 003 | 87, 583 |
| Texas | 1, 033, 266 | 1, 130, 000 | 1, 225, 000 | 1, 281, 000 | 1, 289, 841 | 1, 411, 663 | 1, 879, 227 | 2, 173, 000 | 2, 292, 860 | 2, 358, 900 | 2, 531, 698 | 2, 692, 854 |
| Utah | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) | 6, 700 | 4, 320 | 6, 040 | 6, 650 |
| West Virginia | 159, 130 | 146, 640 | 169, 054 | 201, 417 | 218, 528 | 226, 495 | 237, 572 | 202, 393 | 181, 076 | 198, 895 | 194, 231 | 205, 916 |
| Wyoming | 32, 007 | 29, 227 | 34, 828 | 30, 830 | 30, 590 | 34, 010 | 38, 043 | 38, 758 | 40, 600 | 37, 853 | 46, 262 | 68, 271 |
| Other States | 2, 640 | 4, 700 | 5, 250 | 5, 400 | 5, 750 | 5, 400 | 4, 820 | 6, 550 | 330 | 467 | 622 | 950 |

[1] Included in other States.

NOTE.—Gross production less quantities repressured.
Source: U. S. Bureau of Mines.

TABLE D–22.—*Natural gas treated for natural gasoline and allied products, and quantities and value of products recovered, 1932–49*

| Year | Natural gas treated (millions of cubic feet) | Products recovered | | | | | |
|---|---|---|---|---|---|---|---|
| | | Natural gasoline and cycling plants | | Liquefied petroleum gases | | Other products | |
| | | Quantity (thousands of gallons) | Value (thousands of dollars) | Quantity (thousands of gallons) | Value (thousands of dollars) | Quantity (thousands of gallons) | Value (thousands of dollars) |
| 1932 | 1,499,756 | 1,523,800 | 49,244 | (1) | (1) | (2) | (2) |
| 1933 | 1,551,464 | 1,420,000 | 54,368 | (1) | (1) | (2) | (2) |
| 1934 | 1,776,172 | 1,535,360 | 60,523 | (1) | (1) | (2) | (2) |
| 1935 | 1,822,000 | 1,651,986 | 70,940 | (1) | (1) | (2) | (2) |
| 1936 | 1,815,000 | 1,796,340 | 84,572 | (1) | (1) | (2) | (2) |
| 1937 | 2,108,800 | 2,065,434 | 97,125 | (1) | (1) | (2) | (2) |
| 1938 | 2,035,562 | 2,156,574 | 87,266 | (1) | (1) | (2) | (2) |
| 1939 | 2,150,000 | 2,169,300 | 90,050 | (1) | (1) | (2) | (2) |
| 1940 | 2,471,400 | 2,339,400 | 68,261 | (1) | (1) | (2) | (2) |
| 1941 | 2,763,300 | 2,208,360 | 88,877 | 707,196 | 13,305 | 480,354 | 16,938 |
| 1942 | 2,864,400 | 2,071,104 | 78,170 | 773,556 | 19,000 | 654,864 | 24,395 |
| 1943 | 3,028,000 | 2,115,372 | 95,273 | 910,854 | 24,410 | 657,846 | 27,227 |
| 1944 | 3,300,000 | 2,188,284 | 110,800 | 1,170,624 | 34,300 | 843,024 | 37,400 |
| 1945 | 3,653,870 | 2,498,741 | 112,018 | 1,413,224 | 41,994 | 792,208 | 33,552 |
| 1946 | 3,663,760 | 2,691,001 | 111,798 | 1,409,345 | 36,079 | 769,687 | 34,404 |
| 1947 | 4,070,150 | 2,743,731 | 171,057 | 1,891,818 | 66,820 | 915,718 | 57,117 |
| 1948 [3] | 4,400,000 | 2,950,925 | 263,141 | 2,180,698 | 112,042 | 978,504 | 88,435 |
| 1949 [3] | (1) | 4,187,000 | 294,000 | 2,335,000 | 93,000 | (2) | (2) |

[1] Not available.
[2] Included with natural gasoline and cycling plants.
[3] Preliminary.

Source: U. S. Bureau of Mines.

*Electric energy*

Production of electric energy by electric utilities has increased from about 40 billions of killowatt-hours in 1920 to almost 290 billions in 1949. The increase has been particularly rapid since the middle 1930's. Hydroelectric power, which provided 40 percent of the total in 1920, now provides less than one-third of the total.

The total 1949 electric utility production, together with the component amounts produced by hydro, steam, and internal combustion prime movers is given below. Corresponding annual data for the period beginning with 1920, the first year of this continuous series for which information is available, are shown for comparison. Although the year 1949 was marked by an increase of only 3 percent, it is evident from table D–23 that the year's operations represented a definite continuation of the upward trend of energy requirements since the end of World War II. In fact, with the exception of 1938 and 1945, every year since 1932 has registered a production increase and in only 6 of the past 30 years represented has there been an annual decline.

TABLE D–23.—*Production of electric energy by type of prime mover, 1920–49*

[Kilowatt-hours]

| | Total | Hydro | Steam | Internal combustion |
|---|---|---|---|---|
| 1949 | 291, 099, 543, 000 | 89, 748, 246, 000 | 197, 878, 185, 000 | 3, 473, 112, 000 |
| 1948 | 282, 698, 214, 000 | 82, 469, 742, 000 | 196, 928, 034, 000 | 3, 300, 438, 000 |
| 1947 | 255, 738, 984, 000 | 78, 425, 492, 000 | 174, 500, 274, 000 | 2, 813, 218, 000 |
| 1946 | 223, 177, 783, 000 | 78, 405, 973, 000 | 142, 412, 240, 000 | 2, 359, 570, 000 |
| 1945 | 272, 486, 283, 000 | 79, 970, 312, 000 | 140, 435, 268, 000 | 2, 080, 703, 000 |
| 1944 | 228, 188, 844, 000 | 73, 945, 184, 000 | 152, 327, 495, 000 | 1, 916, 165, 000 |
| 1943 | 217, 758, 831, 000 | 73, 632, 223, 000 | 142, 380, 595, 000 | 1, 746, 013, 000 |
| 1942 | 185, 979, 476, 000 | 63, 870, 575, 000 | 120, 478, 951, 000 | 1, 629, 950, 000 |
| 1941 | 164, 787, 878, 000 | 50, 862, 952, 000 | 112, 319, 000, 000 | 1, 605, 926, 000 |
| 1940 | 141, 837, 010, 000 | 47, 321, 278, 000 | 93, 001, 735, 000 | 1, 513, 997, 000 |
| 1939 | 127, 641, 804, 000 | 43, 563, 627, 000 | 82, 783, 741, 000 | 1, 294, 436, 000 |
| 1938 | 113, 812, 371, 000 | 44, 279, 309, 000 | 68, 423, 122, 000 | 1, 109, 940, 000 |
| 1937 | 118, 912, 675, 000 | 44, 012, 945, 000 | 73, 890, 698, 000 | 1, 009, 032, 000 |
| 1936 | 109, 316, 033, 000 | 39, 057, 647, 000 | 69, 359, 153, 000 | 899, 233, 000 |
| 1935 | 95, 287, 390, 000 | 38, 372, 154, 000 | 56, 144, 412, 000 | 770, 824, 000 |
| 0934 | 87, 257, 753, 000 | 32, 684, 157, 000 | 53, 938, 388, 000 | 635, 208, 000 |
| 1933 | 81, 740, 069, 000 | 33, 457, 189, 000 | 47, 708, 527, 000 | 574, 353, 000 |
| 1932 | 79, 392, 929, 000 | 32, 877, 809, 000 | 45, 922, 394, 000 | 592, 726, 000 |
| 1931 | 87, 350, 101, 000 | 29, 027, 455, 000 | 57, 685, 341, 000 | 637, 305, 000 |
| 1930 | 91, 111, 548, 000 | 31, 189, 554, 000 | 59, 293, 363, 000 | 628, 631, 000 |
| 1929 | 92, 180, 273, 000 | 32, 647, 659, 000 | 58, 965, 559, 000 | 567, 055, 000 |
| 1928 | 82, 793, 647, 000 | 32, 873, 906, 000 | 49, 370, 206, 000 | 549, 535, 000 |
| 1927 | 75, 418, 306, 000 | 28, 474, 237, 000 | 46, 614, 831, 000 | 329, 238, 000 |
| 1926 | 69, 352, 796, 000 | 25, 602, 696, 000 | 43, 422, 070, 000 | 328, 030, 000 |
| 1925 | 61, 451, 091, 000 | 21, 797, 874, 000 | 39, 367, 118, 000 | 286, 099, 000 |
| 1924 | 54, 661, 796, 000 | 19, 489, 596, 000 | 34, 954, 601, 000 | 217, 599, 000 |
| 1923 | 51, 228, 664, 000 | 18, 939, 708, 000 | 32, 092, 555, 000 | 196, 401, 000 |
| 1922 | 43, 632, 457, 000 | 16, 875, 956, 000 | 26, 578, 966, 000 | 177, 535, 000 |
| 1921 | 37, 180, 123, 000 | 14, 703, 013, 000 | 22, 311, 423, 000 | 165, 687, 000 |
| 1920 | 39, 404, 639, 000 | 15, 760, 296, 000 | 23, 488, 451, 000 | 155, 892, 000 |

Table D–23 shows the trend of annual kilowatt-hour production starting with 1920 and continuing through 1949. As may be observed in the table, the limited postwar decline in production rapidly developed into a very sharp upward movement far exceeding previous high levels.

Source: Federal Power Commission.

In general, production of electric energy, particularly that from steam and internal combustion, corresponds rather closely to population concentrations, the five leading States in 1949 being New York, California, Pennsylvania, Ohio, and Illinois. Those States with major water power resources, or water power and population concentrations were the leading generators of electricity from hydroelectric power with Washington and California being well out in front.

Table D–24, immediately following, gives the 1949 production amounts by States and geographic divisions. The number of kilowatt-hours produced in each State by the use of hydro, steam, or internal-combustion prime movers is also shown. The five leading States in order of their 1949 production rank were New York, California, Pennsylvania, Ohio, and Illinois. The leading hydro State was Washington with California second, while New York and Pennsylvania in order were the first and second States in terms of steam-electric production.

TABLE D–24.—*Production of electric energy by States and type of prime mover, 1949, with comparative 1948 data*

[Thousands of kilowatt-hours]

| Division and State | Total | | Hydro | | Steam | | Internal combustion | |
|---|---|---|---|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 |
| United States | 291,099,543 | 282,698,214 | 89,748,246 | 82,469,742 | 197,878,185 | 196,928,034 | 3,473,112 | 3,300,438 |
| New England | 14,275,119 | 14,340,799 | 3,218,431 | 3,025,802 | 10,936,391 | 11,217,541 | 120,297 | 97,456 |
| Middle Atlantic | 56,932,537 | 57,432,338 | 9,037,631 | 9,063,847 | 47,786,109 | 48,270,098 | 108,797 | 98,393 |
| East North Central | 66,253,043 | 65,141,392 | 2,747,552 | 2,498,138 | 62,876,754 | 62,040,895 | 628,737 | 602,359 |
| West North Central | 17,486,390 | 16,250,127 | 2,833,272 | 2,311,459 | 13,184,833 | 12,633,536 | 1,468,285 | 1,305,132 |
| South Atlantic | 36,972,827 | 36,088,537 | 11,043,559 | 9,326,111 | 25,677,977 | 26,535,865 | 251,291 | 226,561 |
| East South Central | 21,823,891 | 21,242,351 | 16,096,746 | 13,011,447 | 5,690,264 | 8,198,334 | 36,881 | 32,570 |
| West South Central | 19,429,028 | 17,793,394 | 1,349,516 | 1,022,444 | 17,523,327 | 16,161,961 | 556,185 | 608,989 |
| Mountain | 15,443,778 | 14,807,916 | 12,012,218 | 11,660,802 | 3,162,622 | 2,856,439 | 268,938 | 290,675 |
| Pacific | 42,482,930 | 39,601,360 | 31,409,321 | 30,549,692 | 11,039,908 | 9,013,365 | 33,701 | 38,303 |
| New England: | | | | | | | | |
| Maine | 1,502,786 | 1,476,486 | 1,091,408 | 984,792 | 368,292 | 460,687 | 43,086 | 31,007 |
| New Hampshire | 1,085,593 | 1,059,882 | 708,996 | 654,354 | 369,878 | 396,993 | 6,719 | 8,535 |
| Vermont | 661,094 | 623,517 | 625,365 | 580,204 | 16,731 | 22,657 | 18,998 | 20,656 |
| Massachusetts | 5,641,574 | 5,987,292 | 558,819 | 531,345 | 5,039,123 | 5,426,272 | 43,632 | 29,675 |
| Rhode Island | 1,570,705 | 1,363,767 | 5,576 | 8,921 | 1,564,649 | 1,354,521 | 480 | 325 |
| Connecticut | 3,813,367 | 3,829,855 | 228,267 | 266,186 | 3,577,718 | 3,556,411 | 7,382 | 7,258 |
| Middle Atlantic: | | | | | | | | |
| New York | 26,880,310 | 27,164,289 | 7,308,388 | 7,206,162 | 19,499,510 | 19,894,150 | 72,412 | 63,977 |
| New Jersey | 8,850,012 | 8,357,041 | 25,349 | 31,191 | 8,815,966 | 8,317,214 | 8,697 | 8,636 |
| Pennsylvania | 21,202,215 | 21,911,008 | 1,703,894 | 1,826,494 | 19,470,633 | 20,058,734 | 27,688 | 25,780 |
| East North Central: | | | | | | | | |
| Ohio | 19,142,508 | 19,214,875 | 27,272 | 27,729 | 19,059,264 | 19,134,851 | 55,972 | 52,295 |
| Indiana | 8,932,517 | 8,767,275 | 136,597 | 115,041 | 8,724,943 | 8,573,529 | 70,977 | 78,705 |
| Illinois | 18,653,593 | 18,273,679 | 194,361 | 182,213 | 18,362,434 | 18,003,641 | 96,798 | 87,825 |
| Michigan | 13,198,226 | 12,756,777 | 1,369,281 | 1,317,595 | 11,549,390 | 11,193,220 | 279,555 | 245,962 |
| Wisconsin | 6,326,199 | 6,128,786 | 1,020,041 | 855,560 | 5,180,723 | 5,135,654 | 125,435 | 137,572 |
| West North Central: | | | | | | | | |
| Minnesota | 4,084,972 | 3,948,430 | 685,593 | 630,301 | 3,170,894 | 3,106,705 | 228,485 | 211,424 |
| Iowa | 4,014,834 | 3,592,136 | 747,588 | 661,567 | 2,791,623 | 2,547,814 | 475,623 | 382,755 |
| Missouri | 3,538,227 | 3,225,523 | 766,046 | 458,542 | 2,557,047 | 2,564,029 | 215,134 | 202,952 |
| North Dakota | 565,329 | 499,402 | | | 498,009 | 450,844 | 67,320 | 48,558 |
| South Dakota | 458,766 | 426,454 | 11,080 | 16,293 | 338,370 | 304,437 | 109,316 | 105,724 |
| Nebraska | 1,850,720 | 1,747,643 | 600,780 | 526,257 | 1,107,648 | 1,087,419 | 142,292 | 133,967 |
| Kansas | 2,973,542 | 2,810,539 | 22,185 | 18,499 | 2,721,242 | 2,572,288 | 230,115 | 219,752 |
| South Atlantic: | | | | | | | | |
| Delaware | 15,603 | 34,579 | | | 7,325 | 27,290 | 8,278 | 7,280 |
| Maryland | 4,572,819 | 5,008,678 | 1,309,279 | 1,375,709 | 3,238,356 | 3,610,079 | 25,184 | 22,890 |
| District of Columbia | 2,082,873 | 2,374,401 | 2,917 | 5,013 | 2,079,956 | 2,369,388 | | |
| Virginia | 4,780,203 | 4,313,355 | 858,731 | 708,636 | 3,879,237 | 3,571,898 | 42,235 | 32,821 |
| West Virginia | 6,071,622 | 6,504,687 | 507,216 | 462,774 | 5,563,147 | 6,039,239 | 1,259 | 2,674 |
| North Carolina | 7,627,550 | 7,061,475 | 3,601,604 | 2,711,505 | 3,987,553 | 4,317,096 | 38,393 | 32,874 |
| South Carolina | 3,321,899 | 3,175,383 | 2,975,313 | 2,552,979 | 343,749 | 609,599 | 2,837 | 12,805 |
| Georgia | 4,341,654 | 3,882,778 | 1,745,886 | 1,450,079 | 2,589,685 | 2,428,404 | 6,083 | 4,295 |
| Florida | 4,158,604 | 3,733,201 | 42,613 | 59,416 | 3,988,969 | 3,562,863 | 127,022 | 110,922 |
| East South Central: | | | | | | | | |
| Kentucky | 3,595,182 | 3,961,260 | 1,754,856 | 1,471,873 | 1,829,071 | 2,481,791 | 11,255 | 7,596 |
| Tennessee | 8,712,675 | 8,416,841 | 7,459,922 | 5,774,102 | 1,247,064 | 2,637,778 | 5,689 | 4,961 |
| Alabama | 8,706,519 | 8,289,108 | 6,881,968 | 5,765,472 | 1,824,101 | 2,523,268 | 450 | 368 |
| Mississippi | 809,515 | 575,142 | | | 790,028 | 555,497 | 19,487 | 19,645 |
| West South Central: | | | | | | | | |
| Arkansas | 1,325,529 | 1,027,581 | 345,380 | 253,677 | 925,500 | 722,425 | 54,649 | 51,479 |
| Louisiana | 4,627,204 | 4,408,804 | | | 4,492,815 | 4,265,325 | 134,389 | 143,479 |
| Oklahoma | 2,810,299 | 2,660,518 | 388,659 | 271,976 | 2,292,400 | 2,262,563 | 129,240 | 125,979 |
| Texas | 10,665,996 | 9,696,491 | 615,477 | 496,791 | 9,812,612 | 8,911,648 | 237,907 | 288,052 |
| Mountain: | | | | | | | | |
| Montana | 2,915,361 | 2,869,825 | 2,888,040 | 2,843,056 | 25,968 | 24,891 | 1,353 | 1,878 |
| Idaho | 1,840,226 | 1,622,107 | 1,836,405 | 1,618,299 | | | 3,821 | 3,808 |
| Wyoming | 506,207 | 388,656 | 326,433 | 279,965 | 170,052 | 95,308 | 9,722 | 13,383 |
| Colorado | 1,630,959 | 1,592,067 | 328,572 | 365,305 | 1,244,878 | 1,170,847 | 57,509 | 55,915 |
| New Mexico | 910,885 | 845,696 | 89,080 | 80,619 | 778,265 | 720,862 | 43,540 | 44,215 |
| Arizona | 3,434,179 | 3,282,118 | 2,603,015 | 2,529,798 | 717,719 | 622,248 | 113,445 | 130,072 |
| Utah | 614,598 | 600,208 | 358,633 | 344,367 | 225,740 | 222,283 | 30,225 | 33,558 |
| Nevada | 3,591,363 | 3,607,239 | 3,582,040 | 3,599,393 | | | 9,323 | 7,846 |
| Pacific: | | | | | | | | |
| Washington | 15,079,298 | 13,881,239 | 14,753,477 | 13,609,304 | 321,383 | 267,585 | 4,438 | 4,350 |
| Oregon | 5,291,441 | 5,433,228 | 4,955,067 | 5,126,377 | 330,849 | 303,677 | 5,525 | 3,174 |
| California | 22,112,191 | 20,286,893 | 11,700,777 | 11,814,011 | 10,387,676 | 8,442,103 | 23,738 | 30,779 |

Source: Federal Power Commission.

Generating capacity has had a very rapid increase since the plateau of the 1930's, standing at slightly more than 63,000,000 kilowatts in 1949 as compared with less than 1,000,000 kilowatts 50 years earlier and less than 13,000,000 in 1920. Hydro, since 1920, has expanded a little more than fourfold, steam generation nearly fivefold, and internal combustion more than eighteenfold.

Electric utility generating plants had installed capacity totaling 63,100,334 kilowatts at the end of 1949. The 1949 annual net increase of 6,540,496 kilowatts, or 11.6 percent, over 1948 represents the largest annual net capacity addition of the industry's construction experience. The maximum gain in capacity prior to 1949 was made in 1948 with a net addition of 4,237,831 kilowatts. Of the 1949 increase, hydro capacity accounted for 1,002,541 kilowatts about half of which was added in the Pacific coast region, and steam capacity net additions were 5,336,186 kilowatts. The net gain in internal-combustion-engine-driven generators amounted to 201,769 kilowatts. These increases, related to the corresponding 1948 installed capacity, are: 6.4 percent for hydro, 13.6 and 12.6 percent for steam and internal combustion respectively.

Table D–25 shows by years for the period starting with 1920 the installed capacity (name plate rating of generators) of generating equipment by prime mover types.

TABLE D–25.—*Capacity of generating plants by type of prime mover, Dec. 31, 1920–49*

[Kilowatts]

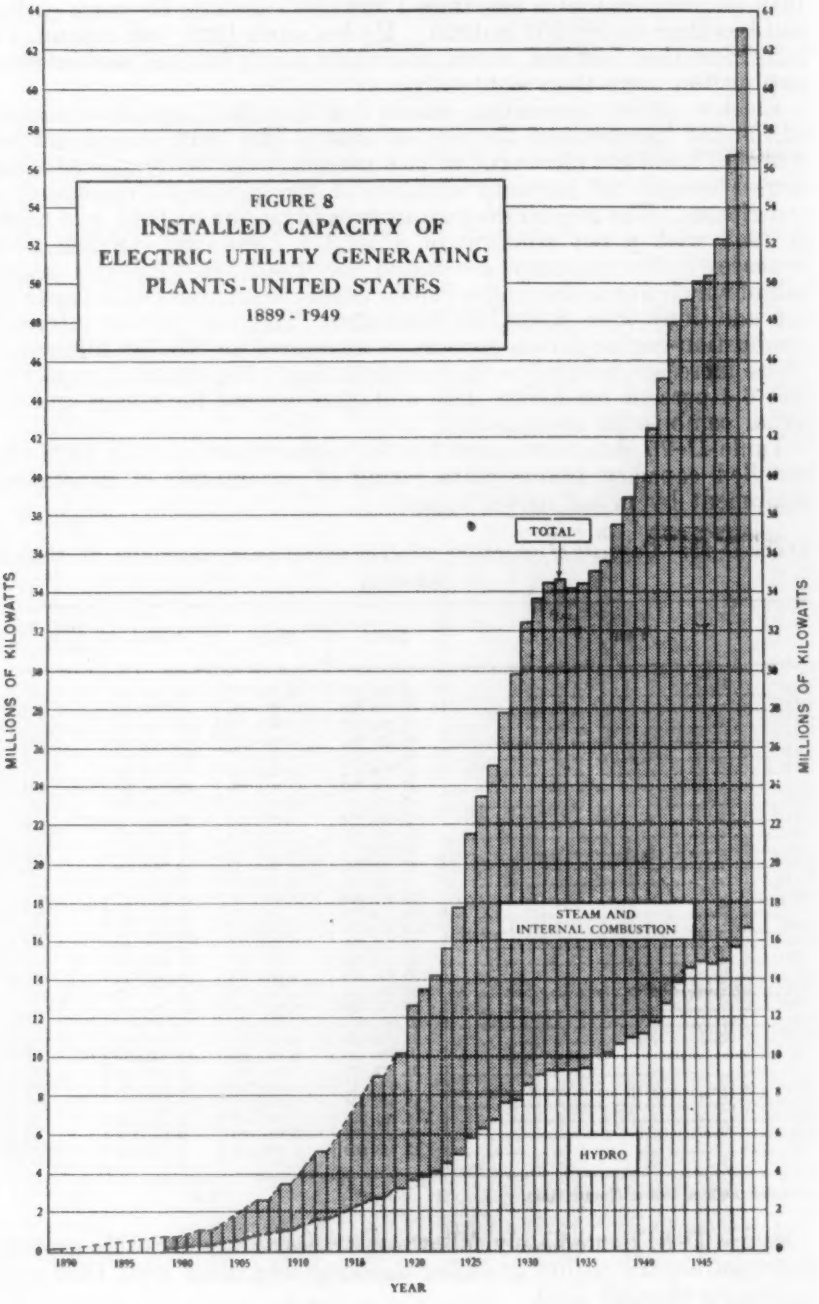
| Year | Total | Hydro | Steam | Internal combustion |
|---|---|---|---|---|
| 1949 | 63, 100. 334 | 16, 654, 171 | 44. 640, 219 | 1, 805, 944 |
| 1948 | 56, 559, 838 | 15, 651, 630 | 39, 304, 033 | 1, 604, 175 |
| 1947 | 52. 322, 007 | 14, 970, 749 | 36, 034, 517 | 1, 316, 741 |
| 1946 | 50, 316, 621 | 14, 848, 491 | 34, 312. 732 | 1. 155. 398 |
| 1945 | 50, 110. 928 | 14, 911, 617 | 34, 112, 603 | 1, 086, 708 |
| 1944 | 49, 189, 072 | 14, 586, 324 | 33, 540, 807 | 1, 061. 941 |
| 1943 | 47, 950, 767 | 13. 883, 583 | 33. 014, 581 | 1. 052, 603 |
| 1942 | 45, 052, 950 | 12. 841. 933 | 31. 168, 567 | 1, 042, 450 |
| 1941 | 42, 405, 436 | 11, 817, 374 | 29. 599, 285 | 988, 777 |
| 1940 | 39, 926, 881 | 11, 223, 729 | 27, 774, 957 | 928. 195 |
| 1939 | 38, 862, 716 | 11, 003, 939 | 27. 008, 613 | 850, 164 |
| 1938 | 37, 492. 095 | 10, 657, 162 | 26, 066, 106 | 768, 827 |
| 1937 | 35, 620. 011 | 10, 175, 663 | 24, 762, 910 | 681, 438 |
| 1936 | 35, 081, 569 | 10, 037, 165 | 24, 441, 077 | 603. 327 |
| 1935 | 34, 435, 768 | 9, 398, 662 | 24. 470, 821 | 566, 285 |
| 1934 | 34, 118. 741 | 9. 344, 933 | 24. 253, 061 | 520, 747 |
| 1933 | 34, 586, 688 | 9. 333, 695 | 24, 759, 185 | 493, 808 |
| 1932 | 34. 386, 739 | 9, 257, 651 | 24, 645, 949 | 483, 139 |
| 1931 | 33, 698, 256 | 9, 090, 613 | 24, 161, 890 | 445, 753 |
| 1930 | 32. 384, 363 | 8, 585, 164 | 23. 385. 522 | 413, 677 |
| 1929 | 29, 839, 459 | 7, 813, 448 | 21. 703, 992 | 322. 019 |
| 1928 | 27, 804, 576 | 7, 702, 433 | 19, 789, 664 | 312, 479 |
| 1927 | 25, 079, 025 | 6, 802, 351 | 18, 077, 937 | 198, 737 |
| 1926 | 23, 386, 194 | 6, 405, 462 | 16, 792, 031 | 188, 701 |
| 1925 | 21. 472. 077 | 5, 921, 965 | 15, 368, 252 | 181, 860 |
| 1924 | 17, 680, 743 | 5, 023, 872 | 12, 534. 567 | 122, 304 |
| 1923 | 15. 642. 537 | 4, 507, 020 | 11, 025. 811 | 109, 706 |
| 1922 | 14. 191, 922 | 4, 128, 476 | 9, 965. 384 | 98, 062 |
| 1921 | 13, 518, 734 | 3, 901, 661 | 9, 526, 573 | 90, 500 |
| 1920 | 12, 713, 608 | 3, 703, 531 | 8, 919, 727 | 90, 350 |

Source: Federal Power Commission.

Figure D–8, immediately following, traces the remarkable growth record of electric utility installed capacity beginning with 1889 and continuing through 1949.

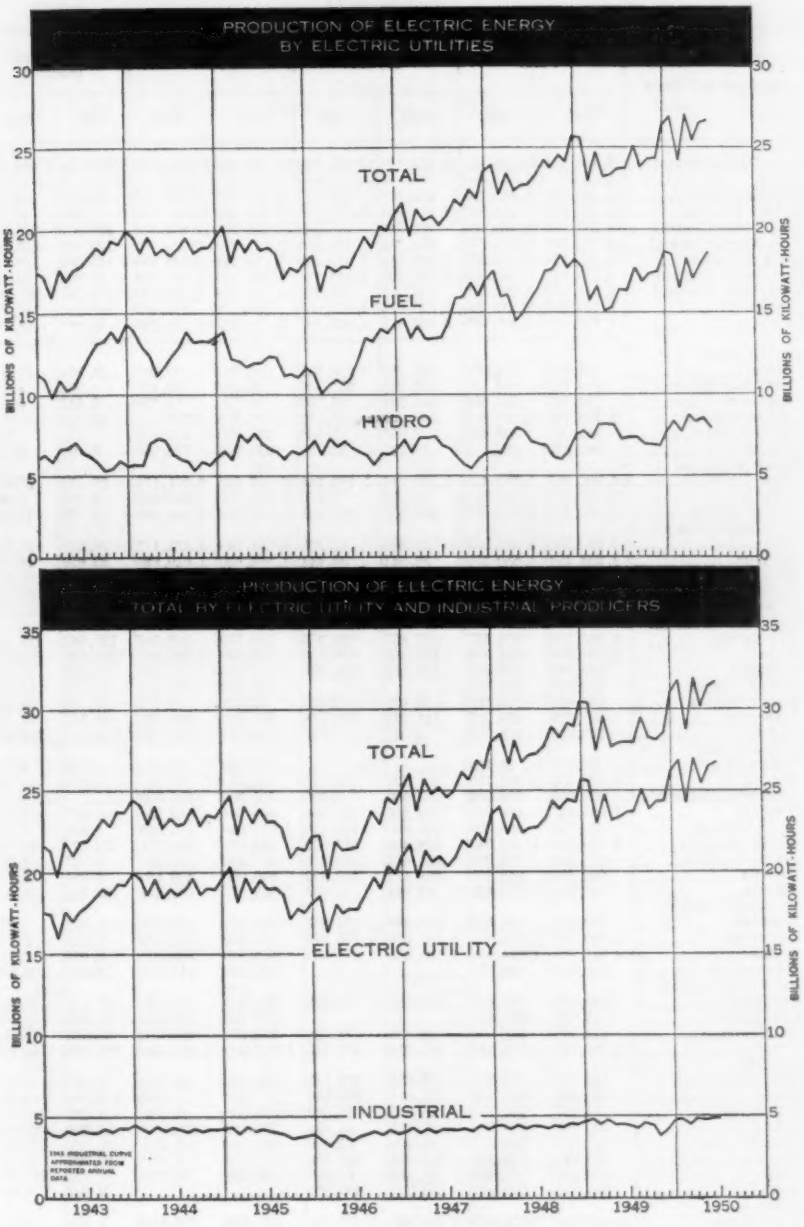
Electric energy production of industrial establishments in 1949 stood at approximately one-sixth the level of production of the electric utilities. (Figure D–9.)

FIGURE D–8.




Source: Federal Power Commission.

FIGURE D–9.




Source: Federal Power Commission.

TABLE D–26.—*Capacity of generating plants by States and type of prime mover—Dec. 31, 1949, with comparative 1948 data*

[Kilowatts]

| Division and State | Total | | Hydro | | Steam | | Internal combustion | |
|---|---|---|---|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 | 1949 | 1948 |
| United States | 63,100,334 | 56,559,838 | 16,654,171 | 15,651,630 | 44,640,219 | 39,304,033 | 1,805,944 | 1,604,175 |
| New England | 3,889,581 | 3,565,768 | 931,576 | 921,366 | 2,895,715 | 2,595,745 | 62,290 | 48,657 |
| Middle Atlantic | 12,623,832 | 11,741,837 | 1,610,898 | 1,590,016 | 10,961,448 | 10,107,092 | 51,486 | 44,729 |
| East North Central | 14,587,766 | 12,863,989 | 763,463 | 742,303 | 13,554,957 | 11,891,456 | 269,346 | 230,230 |
| West North Central | 4,556,295 | 3,978,250 | 574,785 | 563,884 | 3,261,080 | 2,780,764 | 720,430 | 633,602 |
| South Atlantic | 7,987,628 | 7,288,357 | 2,217,819 | 2,221,060 | 5,629,268 | 4,938,895 | 140,541 | 128,402 |
| East South Central | 4,170,946 | 3,740,802 | 2,561,898 | 2,335,198 | 1,585,099 | 1,384,184 | 23,949 | 21,420 |
| West South Central | 4,004,804 | 3,357,570 | 420,247 | 385,247 | 3,270,775 | 2,680,635 | 313,782 | 291,688 |
| Mountain | 3,149,784 | 2,852,266 | 2,197,073 | 2,051,058 | 784,578 | 651,463 | 168,133 | 149,745 |
| Pacific | 8,129,698 | 7,170,999 | 5,376,412 | 4,841,498 | 2,697,299 | 2,273,799 | 55,987 | 55,702 |
| New England: | | | | | | | | |
| Maine | 388,936 | 374,211 | 264,762 | 253,647 | 100,000 | 102,000 | 24,174 | 18,564 |
| New Hampshire | 383,741 | 350,115 | 246,235 | 247,805 | 133,250 | 97,930 | 4,256 | 4,380 |
| Vermont | 190,949 | 189,594 | 166,362 | 165,697 | 14,750 | 14,750 | 9,837 | 9,147 |
| Massachusetts | 1,599,724 | 1,440,617 | 164,247 | 164,247 | 1,416,775 | 1,265,125 | 18,702 | 11,242 |
| Rhode Island | 362,421 | 322,421 | 3,250 | 3,250 | 358,950 | 318,950 | 221 | 221 |
| Connecticut | 963,810 | 888,810 | 86,720 | 86,720 | 871,990 | 796,990 | 5,100 | 5,100 |
| Middle Atlantic: | | | | | | | | |
| New York | 5,996,917 | 5,762,423 | 1,163,047 | 1,161,245 | 4,796,695 | 4,571,175 | 37,175 | 30,003 |
| New Jersey | 2,041,582 | 1,880,207 | 6,350 | 7,270 | 2,032,050 | 1,869,635 | 3,182 | 3,302 |
| Pennsylvania | 4,585,333 | 4,099,207 | 441,501 | 421,501 | 4,132,703 | 3,666,282 | 11,129 | 11,424 |
| East North Central: | | | | | | | | |
| Ohio | 4,219,796 | 3,549,759 | 11,525 | 11,525 | 4,181,943 | 3,513,117 | 26,328 | 25,117 |
| Indiana | 1,934,194 | 1,680,899 | 36,944 | 35,444 | 1,864,630 | 1,619,680 | 32,620 | 25,775 |
| Illinois | 3,893,920 | 3,581,519 | 48,629 | 49,414 | 3,798,759 | 3,494,284 | 46,532 | 37,821 |
| Michigan | 2,916,161 | 2,621,141 | 386,330 | 367,041 | 2,420,725 | 2,158,225 | 109,106 | 95,875 |
| Wisconsin | 1,623,695 | 1,430,671 | 280,035 | 278,879 | 1,288,900 | 1,106,150 | 54,760 | 45,642 |
| West North Central: | | | | | | | | |
| Minnesota | 1,045,318 | 876,577 | 137,857 | 126,053 | 779,579 | 633,304 | 127,882 | 117,220 |
| Iowa | 1,049,893 | 895,319 | 135,316 | 135,486 | 709,749 | 594,203 | 204,828 | 165,630 |
| Missouri | 895,386 | 853,499 | 150,573 | 150,525 | 646,165 | 611,265 | 98,648 | 91,709 |
| North Dakota | 172,887 | 138,651 | | | 137,315 | 109,315 | 35,572 | 29,336 |
| South Dakota | 155,825 | 140,175 | 3,421 | 3,425 | 92,612 | 80,112 | 59,792 | 56,638 |
| Nebraska | 527,526 | 455,315 | 141,233 | 141,778 | 305,910 | 240,835 | 80,383 | 72,702 |
| Kansas | 709,460 | 618,714 | 6,385 | 6,617 | 589,750 | 511,730 | 113,325 | 100,367 |
| South Atlantic: | | | | | | | | |
| Delaware | 27,868 | 28,108 | | | 23,150 | 23,150 | 4,718 | 4,958 |
| Maryland | 1,025,464 | 1,009,789 | 271,325 | 271,325 | 741,525 | 726,525 | 12,614 | 11,939 |
| District of Columbia | 508,000 | 508,000 | 3,000 | 3,000 | 505,000 | 505,000 | | |
| Virginia | 1,065,427 | 861,271 | 182,246 | 181,994 | 859,504 | 658,255 | 23,677 | 21,022 |
| West Virginia | 1,130,789 | 955,905 | 100,880 | 100,940 | 1,025,010 | 850,010 | 4,899 | 4,955 |
| North Carolina | 1,626,308 | 1,485,943 | 658,860 | 657,570 | 944,621 | 809,721 | 22,827 | 18,652 |
| South Carolina | 823,702 | 823,203 | 650,675 | 650,676 | 167,430 | 167,430 | 5,597 | 5,097 |
| Georgia | 882,186 | 845,816 | 338,172 | 342,892 | 540,950 | 499,150 | 3,064 | 3,774 |
| Florida | 897,884 | 770,322 | 12,661 | 12,663 | 822,078 | 699,654 | 63,145 | 58,005 |
| East South Central: | | | | | | | | |
| Kentucky | 779,134 | 721,572 | 270,860 | 270,860 | 503,001 | 447,876 | 5,273 | 2,836 |
| Tennessee | 1,609,738 | 1,494,096 | 1,187,075 | 1,072,375 | 419,450 | 419,450 | 3,213 | 2,271 |
| Alabama | 1,581,763 | 1,394,363 | 1,103,963 | 991,963 | 475,340 | 399,090 | 2,460 | 3,310 |
| Mississippi | 200,311 | 130,771 | | | 187,308 | 117,768 | 13,003 | 13,003 |
| West South Central: | | | | | | | | |
| Arkansas | 330,559 | 259,458 | 102,008 | 102,008 | 201,445 | 132,445 | 27,106 | 25,005 |
| Louisiana | 743,425 | 699,377 | | | 682,700 | 647,820 | 60,725 | 51,557 |
| Oklahoma | 610,143 | 588,905 | 73,624 | 73,624 | 470,570 | 453,070 | 65,949 | 62,211 |
| Texas | 2,320,677 | 1,809,830 | 244,615 | 209,615 | 1,916,060 | 1,447,300 | 160,002 | 152,915 |
| Mountain: | | | | | | | | |
| Montana | 448,771 | 389,361 | 432,638 | 373,138 | 11,968 | 11,968 | 4,165 | 4,255 |
| Idaho | 380,599 | 297,230 | 375,615 | 292,246 | 400 | 400 | 4,584 | 4,584 |
| Wyoming | 115,227 | 104,172 | 55,085 | 54,520 | 50,820 | 40,560 | 9,322 | 9,092 |
| Colorado | 406,661 | 380,909 | 87,785 | 86,585 | 290,648 | 271,848 | 28,228 | 22,476 |
| New Mexico | 261,238 | 200,013 | 24,990 | 25,090 | 203,642 | 143,262 | 32,606 | 31,661 |
| Arizona | 758,818 | 708,855 | 540,540 | 540,759 | 158,350 | 114,675 | 59,928 | 53,421 |
| Utah | 182,798 | 178,804 | 94,145 | 92,445 | 68,750 | 68,750 | 19,903 | 17,609 |
| Nevada | 595,672 | 592,922 | 586,275 | 586,275 | | | 9,397 | 6,647 |
| Pacific: | | | | | | | | |
| Washington | 2,441,838 | 2,076,944 | 2,240,576 | 1,872,736 | 197,820 | 200,820 | 3,442 | 3,388 |
| Oregon | 913,603 | 910,201 | 717,679 | 712,527 | 188,310 | 190,310 | 7,614 | 7,364 |
| California | 4,774,257 | 4,183,854 | 2,418,157 | 2,256,235 | 2,311,169 | 1,882,669 | 44,931 | 44,950 |

Source: Federal Power Commission.

TABLE D–27.—*Production of electric energy and installed generating capacity—industrial establishments and total electric utility and industrial, 1939–49*

INDUSTRIAL[1]

| Year | Production (thousands of kilowatt-hours) | | | | Capacity (kilowatts Dec. 31) | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Hydro | Steam | Internal combustion | Total | Hydro | Steam | Internal combustion |
| 1949 | 53,966,841 | 5,024,748 | 48,942,093 | | 13,469,738 | 1,008,248 | 11,831,460 | 630,030 |
| 1948 | 54,110,351 | 4,522,482 | 49,587,869 | | 13,054,872 | 983,410 | 11,446,694 | 624,768 |
| 1947 | 51,661,409 | 4,640,700 | 47,020,709 | | 12,829,067 | 985,443 | 11,207,236 | 636,388 |
| 1946 | 46,430,941 | 4,744,288 | 41,686,653 | | 12,748,979 | 979,841 | 11,128,942 | 640,196 |
| 1945 | 48,768,613 | 4,776,767 | 41,273,202 | 2,718,644 | 12,756,886 | 980,101 | 11,135,451 | 641,334 |
| 1944 | 51,335,847 | 4,959,379 | 43,336,876 | 3,039,592 | 12,876,664 | 1,109,959 | 11,096,087 | 670,618 |
| 1943 | 49,781,366 | 5,445,430 | 41,571,029 | 2,764,907 | 12,588,603 | 1,107,527 | 10,825,525 | 655,551 |
| 1942 | 47,166,886 | | | | 12,184,237 | | | |
| 1941 | 43,518,573 | | | | 11,589,809 | | | |
| 1940 | 38,069,944 | | | | 11,035,462 | | | |
| 1939 | 33,666,683 | | | | 10,575,449 | | | |

ELECTRIC UTILITY AND INDUSTRIAL

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1949 | 345,066,384 | 94,772,994 | 250,293,390 | | 76,570,072 | 17,662,419 | 56,471,679 | 2,435,974 |
| 1948 | 336,808,565 | 86,992,224 | 249,816,341 | | 69,614,710 | 16,635,040 | 50,750,727 | 2,228,943 |
| 1947 | 307,400,393 | 83,066,192 | 224,334,201 | | 65,151,074 | 15,956,192 | 47,241,753 | 1,953,129 |
| 1946 | 269,608,724 | 83,150,261 | 186,458,463 | | 63,065,600 | 15,828,332 | 45,441,674 | 1,795,594 |
| 1945 | 271,254,896 | 84,747,079 | 181,708,470 | 4,799,347 | 62,867,814 | 15,891,718 | 45,248,054 | 1,728,042 |
| 1944 | 279,524,691 | 78,904,563 | 195,664,371 | 4,955,757 | 62,065,736 | 15,696,283 | 44,636,894 | 1,732,559 |
| 1943 | 267,540,197 | 79,077,653 | 183,951,624 | 4,510,920 | 60,539,370 | 14,991,110 | 43,840,106 | 1,708,154 |
| 1942 | 233,146,362 | | | | 57,237,187 | | | |
| 1941 | 208,306,451 | | | | 53,995,245 | | | |
| 1940 | 179,906,954 | | | | 50,962,343 | | | |
| 1939 | 161,308,487 | | | | 49,438,165 | | | |

[1] Series which started with 1939 data shows information summarized from annual reports through 1945. Totals for 1946 through 1949 based on monthly reports. Details by type of prime mover first available for 1943.

Source: Federal Power Commission.

## 2. EXPORTS AND IMPORTS

Inasmuch as the United States is one of the world's major coal producers, it would be surprising if imports of coal were of any particular significance—the total in recent years has been one-third of a million tons or less.

TABLE E–1.—*Bituminous coal*[1] *imported for consumption in the United States, 1947–49, by countries and customs districts, in net tons*

| Country | 1947 | 1948 | 1949 |
|---|---|---|---|
| North America: | | | |
| Canada | 288,394 | 289,839 | 311,801 |
| Mexico | 114 | 1,148 | 165 |
| South America: Colombia | 6 | | |
| Europe: | | | |
| Greece | | | 13 |
| Italy | | | 6 |
| Netherlands | 130 | | |
| Poland and Danzig | 1,120 | | |
| United Kingdom | 349 | 350 | 2,995 |
| Africa: Union of South Africa | 28 | | |
| Total | 290,141 | 291,337 | 314,980 |

| Customs district | 1947 | 1948 | 1949 |
|---|---|---|---|
| Alaska | 7,372 | 5,755 | 7,535 |
| Chicago | 6 | | 6 |
| Dakota | 758 | 868 | 1,438 |
| Duluth and Superior | | 42 | 186 |
| Florida | 60 | | |
| Galveston | | 1,193 | |
| Hawaii | 64 | | 8,831 |
| Laredo | 114 | | 165 |
| Maine and New Hampshire | 45,418 | 112,269 | 137,033 |
| Massachusetts | | 193 | |
| Michigan | 864 | 148 | 538 |
| Mobile | | | 2,995 |
| Montana and Idaho | 213,313 | 153,777 | 143,926 |
| New Orleans | | 200 | |
| New York | 1,927 | | 144 |
| Rochester | | 55 | |
| St. Lawrence | 77 | [2] | |
| Vermont | 2,099 | 1,403 | 115 |
| Washington | 18,069 | 15,434 | 12,068 |
| Total | 290,141 | 291,337 | 314,980 |

[1] Includes slack, culm, and lignite.
[2] Less than 1 ton.

Source: U. S. Department of Commerce.

Exports are another matter—Canada is regularly a good customer, taking 25,000,000 tons or more in some years. Western Europe, normally a large producer and previously a large exporter, required and obtained large amounts from the United States in the immediate postwar period, amounting to a maximum in 1947 of 36,703,000 tons.

TABLE E–2.—*Exports of bituminous coal, by country groups, 1945–49, in thousands of net tons*

| Year | Canada and Mexico | West Indies and Central America [1] | "Overseas" (all other countries) | | | | | | | Grand total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Newfoundland, Miquelon, Bermuda, Greenland, and Iceland | South America | Europe | Asia | Africa | Oceania | Total "overseas" | |
| 1945 | 21,589 | 295 | 191 | 1,080 | 3,924 | (2) | 873 | 4 | 6,072 | 27,956 |
| 1946 | 21,882 | 253 | 160 | 1,723 | 16,065 | 201 | 878 | 37 | 19,064 | 41,199 |
| 1947 | 25,849 | 369 | 404 | 2,866 | [3] 36,703 | 311 | 2,057 | 108 | [4] 42,449 | [3] 68,667 |
| 1948 | 25,845 | 214 | 159 | 1,867 | [4] 16,093 | 765 | 961 | 26 | [4] 19,871 | [4] 45,930 |
| 1949 | 15,984 | 140 | 122 | 819 | 8,682 | 1,395 | 612 | 88 | 11,718 | 27,842 |

[1] Includes Bahmas and Panama.
[2] Less than 1,000 net tons.
[3] Excludes 102,179 tons ($1,010,820) exported to Austria as a part of the Army civilian supply program.
[4] Revised figure.

Source: U. S. Department of Commerce.

Total United States exports in that year reached the abnormal figure of 68,667,000 tons, more than 10 percent of our production. France and Italy were prominent customers during the abnormal postwar reconstruction period, the former taking more than 12,000,000 tons. Most of the export, to Canada or to Europe, came from the Appalachian field. Shipments to noncontiguous territories of the United States were small.

TABLE E–3.—*Bituminous coal exported from the United States, 1947–49, by countries, in net tons* [1]

| Country | 1947 | 1948 | 1949 |
|---|---|---|---|
| North America: | | | |
| Bermuda | 14,567 | 3,508 | 731 |
| Canada | 25,848,117 | 25,842,797 | 15,982,038 |
| Central America: | | | |
| British Honduras | 30 | 4 | 45 |
| Canal Zone | 34,342 | 22,207 | 9,051 |
| Costa Rica | 50 | 3,177 | 42 |
| El Salvador | 128 | 86 | 176 |
| Guatemala | 257 | 230 | 140 |
| Honduras | 302 | 293 | 276 |
| Nicaragua | 8 | | |
| Panama, Republic of | 35 | 45 | 20 |
| Greenland | 4,493 | | |
| Iceland | 57,627 | | |
| Mexico | 694 | 1,593 | 1,617 |
| Miquelon and St. Pierre | 4,864 | 500 | 4,697 |
| Newfoundland and Laborador | 321,553 | 154,932 | 115,797 |
| West Indies: | | | |
| British: | | | |
| Barbados | 2,574 | 1,225 | |
| Jamaica | 89,339 | 48,890 | 32,465 |
| Leeward and Windward | 14,800 | | |
| Trinidad and Tobago | 100,797 | 57,675 | 33,502 |
| Other British | 491 | 5 | |
| Cuba | 98,277 | 76,471 | 55,907 |
| Dominican Republic | 7,309 | 625 | 106 |

See footnotes at end of table, p. 103.

TABLE E–3.—*Bituminous coal exported from the United States, 1947–49, by countries, in net tons* [1]—Continued

| Country | 1947 | 1948 | 1949 |
|---|---|---|---|
| West Indies—Continued | | | |
| French | 20,448 | 1,910 | 9,330 |
| Haiti | 2 | 15 | 15 |
| Netherlands Antilles | 374 | 2,004 | 137 |
| Total North America | 26,621,478 | 26,218,192 | 16,246,092 |
| South America: | | | |
| Argentina | 1,113,734 | 826,750 | 30,625 |
| Bolivia | 329 | 511 | 15,288 |
| Brazil | 1,468,312 | 959,323 | 681,838 |
| Chile | 163,693 | 27,634 | 29,472 |
| Surinam | 2,570 | 3,875 | 2,510 |
| Uruguay | 117,135 | 48,705 | 58,628 |
| Other South America | 500 | 276 | 321 |
| Total South America | 2,866,273 | 1,867,074 | 818,682 |
| Europe: | | | |
| Austria | [2] 122,391 | 58,447 | |
| Belgium and Luxemburg | 3,363,800 | 630,604 | |
| Denmark | 2,377,583 | 52,098 | |
| Finland | 637,271 | 6,273 | |
| France | 12,466,388 | [3] 8,459,268 | 3,639,516 |
| Germany | 42,630 | 70,777 | |
| Gibraltar | 156,872 | | |
| Greece | 34,056 | 62,830 | |
| Ireland | 1,005,584 | 8 | |
| Italy | 8,780,259 | 4,696,415 | 3,912,139 |
| Netherlands | 2,691,248 | 770,761 | 310,961 |
| Norway | 738,735 | | |
| Portugal | 846,901 | 257,230 | 184,275 |
| Sweden | 2,074,092 | 587,322 | 437,012 |
| Switzerland | 683,400 | 420,621 | 186,655 |
| United Kingdom | 675,043 | | |
| Other Europe | 6,966 | 20,117 | 11,226 |
| Total Europe | [2] 36,703,219 | [3] 16,092,771 | 8,681,784 |
| Asia: | | | |
| China | 4,234 | 40,078 | 40,002 |
| French Indochina | 2,520 | | |
| Hong Kong | 92,203 | | |
| India | 10 | 32,376 | |
| Japan | | 688,776 | 1,355,102 |
| Indonesia | 95,417 | | |
| Malaya | 99,519 | | |
| Palestine and Israel | 3,436 | | |
| Syria | 13,667 | | |
| Other Asia | 23 | 3,934 | 10 |
| Total Asia | 311,029 | 765,164 | 1,395,114 |
| Africa: | | | |
| Algeria | 1,052,370 | 556,686 | 265,576 |
| Belgian Congo | 14,151 | | |
| British West Africa | 36,425 | | |
| Canary Islands | 51,822 | 2,082 | |
| Cape Verde Islands | 89,354 | | |
| Egypt | 298,135 | 27,596 | |
| French Cameroon | 140 | 17,206 | 22,740 |
| French Equatorial Africa | | 10,827 | 46,517 |
| French West Africa | 244,643 | 132,668 | 84,595 |
| Libya | 27,083 | | |
| Madagascar | | 10,918 | 55,273 |
| Maderia Islands | 21,491 | | |
| Morocco, French | 92,020 | 169,551 | 127,753 |
| Spanish Africa | 114,311 | 22,481 | |
| Tunisia | 14,531 | | 9,291 |
| Other Africa | 935 | 10,725 | 6 |
| Total Africa | 2,057,411 | 960,740 | 611,751 |
| Oceania | 107,553 | 26,192 | 88,633 |
| Grand total | [3] 68,666,963 | [3] 45,930,133 | 27,842,056 |

[1] Amounts stated do not include fuel or bunker coal loaded on vessels engaged in foreign trade, which aggregated 1,689,328 tons in 1947, 1,057,118 tons in 1948, and 874,029 tons in 1949.
[2] Exclusive of 102,179 tons exported to Austria as a part of the Army Civilian Supply Program.
[3] Revised figure.

Source: U. S. Department of Commerce.

TABLE E–4.—*Bituminous coal exported from the United States, 1947–49, by customs districts, in net tons*

| Customs district | 1947 | 1948 | 1949 |
|---|---|---|---|
| North Atlantic: | | | |
| Maine and New Hampshire | 57,408 | 5,586 | 6,276 |
| Massachusetts | 61 | | 68 |
| New York | 1,382,037 | 23,788 | 7,196 |
| Philadelphia | 2,740,855 | 453,540 | 32,150 |
| South Atlantic: | | | |
| Georgia | 10,708 | | 560 |
| Maryland | 10,871,709 | 3,471,674 | 1,336,249 |
| South Carolina | 1,825,197 | 768,520 | 54,450 |
| Virginia | 20,146,083 | [1] 13,827,771 | 10,061,387 |
| Gulf coast: | | | |
| Florida | 2,015,102 | 330,455 | 3,501 |
| Galveston | 463,494 | | |
| Mobile | 1,427,881 | 617,042 | 26,388 |
| New Orleans | 315,944 | 7,968 | 1,569 |
| Sabine | 731,418 | | |
| Mexican border: | | | |
| Arizona | 272 | 273 | 265 |
| El Paso | 45 | 1,138 | 1,317 |
| Laredo | 27 | | |
| Pacific coast: | | | |
| Los Angeles | 142,522 | 100 | |
| Oregon | 379,239 | 10,982 | |
| San Diego | 83 | 125 | 10 |
| San Francisco | 20 | 69 | 115 |
| Washington | 301,035 | 134,461 | 37,929 |
| Northern border: | | | |
| Buffalo | 1,548,629 | 1,103,124 | 744,288 |
| Chicago | 1,505,335 | 1,633,134 | 711,818 |
| Dakota | 23,392 | 36,373 | 50,210 |
| Duluth and Superior | 385,036 | 340,995 | 204,062 |
| Michigan | 3,046,644 | 3,127,640 | 2,245,509 |
| Montana and Idaho | 4,431 | 723 | 1,284 |
| Ohio | 11,619,905 | 13,314,027 | 8,763,909 |
| Rochester | 3,829,918 | 3,465,712 | 1,798,570 |
| St. Lawrence | 3,677,266 | 2,815,519 | 1,473,762 |
| Vermont | 4,106 | 5,041 | 1,575 |
| Wisconsin | 193 | | |
| Miscellaneous: | | | |
| Alaska | 204 | 283 | 10 |
| Colorado | 3,037 | | |
| Hawaii | 3,282 | | |
| Indiana | 5 | | |
| Minnesota | | | 74 |
| Pittsburgh | 11,210 | | |
| Puerto Rico | 325 | | |
| Total | [2] 68,666,963 | [1] [2] 45,930,133 | [2] 27,842,056 |

[1] Revised figure.
[2] Includes 192,905 tons in 1947, 434,070 tons in 1948, and 277,555 tons in 1949, representing shipments on vessels operated by the United States Army or Navy. Excludes 102,179 tons exported to Austria in 1947 as a part of the Army Civilian Supply Program.

Source: U. S. Department of Commerce.

TABLE E–5.—*Shipments of bituminous coal to noncontiguous Territories, 1947–49*

| Territory | 1947 | | 1948 | | 1949 | |
|---|---|---|---|---|---|---|
| | Net tons | Value | Net tons | Value | Net tons | Value |
| Alaska [1] | 6,860 | $112,272 | (2) | (2) | (2) | (2) |
| Hawaii | 365 | 10,135 | (2) | (2) | (2) | (2) |
| Puerto Rico | 9,148 | 78,593 | 1,500 | $15,607 | 4,999 | $48,366 |
| Virgin Islands | 44,514 | 334,149 | 25,799 | 264,564 | 20,601 | 196,211 |

[1] Includes shipments of anthracite.
[2] Beginning Apr. 1, 1948, no data available.

Source: U. S. Department of Commerce.

Of the rather substantial anthracite exports from Pennsylvania just after the war, more than half went to Canada, most of the remainder to Western Europe. Small imports of anthracite were almost wholly from Canada to contiguous areas in the Mountain States.

TABLE E–6.—*Anthracite exported from the United States, 1947–49, by countries and customs districts, in net tons*

| Country | 1947 | 1948 | 1949 |
|---|---|---|---|
| North America: | | | |
| Bermuda | 557 | 130 | 958 |
| Canada | 4,470,034 | 4,931,918 | 3,580,568 |
| Mexico | 8,988 | 11,681 | 11,852 |
| Newfoundland and Labrador | 7,880 | 1,675 | 2,729 |
| West Indies: | | | |
| British | 787 | 26 | 72 |
| Cuba | 23,794 | 3,522 | |
| Other North America | 40 | | |
| South America: | | | |
| Argentina | 25,405 | | |
| Bolivia | 53 | | |
| Brazil | 901 | 50 | 70 |
| Chile | 575 | 78 | 70 |
| Surinam | 570 | | |
| Other South America | 6 | | 255 |
| Europe: | | | |
| Belgium-Luxemburg | 1,367,636 | 209,400 | |
| Denmark | 40,550 | | |
| France | 1,404,785 | 1,425,322 | 1,051,313 |
| Ireland | 9,177 | 20 | |
| Italy | 157,945 | 53,386 | 29,772 |
| Netherlands | 41,907 | 4,839 | 155,458 |
| Norway | 201,135 | | |
| Portugal | 2,464 | | |
| Sweden | 577,999 | | |
| Switzerland | 114,851 | | |
| Other Europe | 14 | | 6,671 |
| Asia: | | | |
| China | 286 | 18 | |
| Japan | | 30,820 | 88,227 |
| Malaya, Federation of | 10,044 | | |
| Palestine and Trans-Jordan | 28,369 | | |
| Other Asia | 100 | 168 | 14,725 |
| Africa: | | | |
| Belgian Congo | 2,448 | 2,859 | |
| Egypt | 10,640 | | |
| Other Africa | 55 | 2 | |
| Total | 8,509,995 | 6,675,914 | 4,942,670 |

| Customs district | 1947 | 1948 | 1949 |
|---|---|---|---|
| North Atlantic: | | | |
| Maine and New Hampshire | 42,365 | 31,942 | 16,943 |
| Massachusetts | 38 | | |
| New York | 787,549 | 231,386 | 3,509 |
| Philadelphia | 2,738,308 | 1,472,406 | 1,284,208 |
| Rhode Island | 3,930 | | |
| South Atlantic: | | | |
| Maryland | 511,904 | 10,261 | 164 |
| Puerto Rico | 10 | | |
| South Carolina | 2 | | |
| Virginia | 2,150 | 20 | 62 |
| Gulf coast: | | | |
| Florida | 47 | 6 | 10 |
| Galveston | 5 | | |
| Mobile | 570 | | |
| New Orleans | 125 | 6 | 12 |
| Mexican border: | | | |
| Arizona | 23 | 47 | 51 |
| El Paso | 13 | 8 | 17 |
| Laredo | 7 | | 24 |
| Pacific coast: | | | |
| Alaska | 55 | 10 | |
| San Diego | 45 | 3 | |
| Washington | 93 | 16,433 | 9 |
| Northern border: | | | |
| Buffalo | 2,639,285 | 2,968,582 | 2,257,022 |
| Dakota | 4,383 | 4,412 | 2,945 |
| Duluth and Superior | 8,557 | 7,984 | 11,644 |
| Michigan | 1,454 | 30,037 | 3,724 |
| Montana and Idaho | | 4,296 | |
| Ohio | 6,197 | 12,523 | 14,365 |
| Rochester | 153,115 | 126,683 | 90,901 |
| St. Lawrence | 1,608,294 | 1,725,344 | 1,161,805 |
| Vermont | 1,471 | 2,705 | 2,028 |
| Total | 8,509,995 | [1] 6,675,914 | [1] 54,942,670 |

[1] Includes 30,820 tons shipped on vessels operated by the U. S. Army or Navy in 1948 and 88,227 tons in 1949.

Source: U. S. Department of Commerce.

TABLE E–7.—*Anthracite imported for consumption in the United States, 1947–49, by countries and customs districts, in net tons*

[NOTE: In 1949 there were no imports of anthracite]

| Country | 1947 | 1948 | Customs district | 1947 | 1948 |
|---|---|---|---|---|---|
| Argentina | | 1 | Laredo | 50 | |
| Canada | 10,293 | 144 | Maryland | | 800 |
| Chile | 7 | | Montana and Idaho | 10,293 | |
| Mexico | 50 | | New York | 7 | 1 |
| United Kingdom | | 800 | Washington | | 144 |
| Total | 10,350 | 945 | Total | 10,350 | 945 |

Source: U. S. Department of Commerce.

In addition to being the world's major producer of petroleum from her own resources, the United States also imports crude petroleum and refined products. As long ago as 1922 crude-petroleum imports reached 127,308,000 barrels. Together with imports of refined products, this amount was equal to 36 percent of total domestic crude production. From then on the percentage of imports shrank steadily to between 3–5 percent in the late 1930's. In 1942, when German submarines interfered with our shipping, they had fallen to only 12,297,000 barrels. Imports picked up again right after the war, and they have risen steadily. In 1949 they were 154,933,000 barrels. Together with products imports, this amount equaled 11 percent of domestic crude production. The trends in imports of refined products have fluctuated less widely, reaching a high of 79,209,000 barrels in 1949. Between the years 1922 to 1948, the United States was a net exporter of petroleum. Not until this latter year did our oil imports exceed those of 1922. From 1948 to 1949 crude oil imports rose by about 20 percent; products imports, primarily residual fuel oil, by almost 30 percent.

FIGURE E–1.—UNITED STATES IMPORTS OF CRUDE AND PRODUCTS, BY PRODUCTS, QUARTERLY, 1946–49.

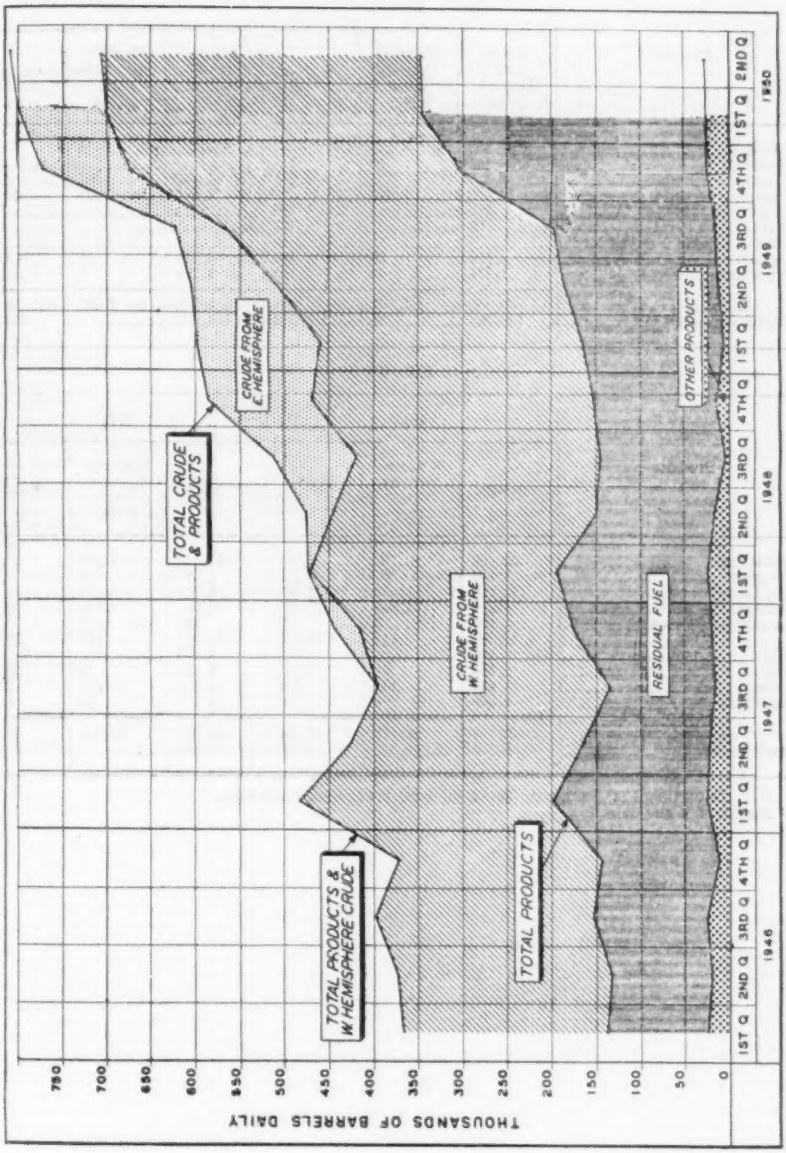



FIGURE E-1.—UNITED STATES IMPORTS OF CRUDE AND PRODUCTS, BY PRODUCTS, QUARTERLY, 1946–49.

Source: Bureau of Mines.

TABLE E–8.—*Imports and exports of crude petroleum and petroleum products*

IMPORTS

[Thousands of barrels]

| Product [1] | 1948 | | | 1949 | | |
|---|---|---|---|---|---|---|
| | Continental United States | Noncontiguous Territories | Total | Continental United States | Noncontiguous Territories | Total |
| Gasoline | 302 | 125 | 427 | | 15 | 15 |
| Kerosene | 135 | 12 | 147 | | | |
| Distillate fuel oil | 2,546 | 5 | 2,551 | 1,720 | 541 | 2,261 |
| Residual fuel oil | 53,269 | 2,400 | 55,669 | 74,555 | 2,238 | 76,793 |
| Lubricants | 101 | | 101 | | | |
| Wax | 27 | | 27 | | | |
| Coke | | | | | | |
| Asphalt | 1,557 | 25 | 1,582 | 1,184 | 86 | 1,270 |
| Other unfinished oils | 1,114 | | 1,114 | 1,750 | 1 | 1,751 |
| Total | 59,051 | 2,567 | 61,618 | 79,209 | 2,881 | 82,090 |
| Crude petroleum [2] | 129,093 | | 129,093 | 154,922 | | 154,922 |

EXPORTS

| Product [1] | 1948 | | | 1949 | | |
|---|---|---|---|---|---|---|
| | Foreign | Noncontiguous Territories | Total | Foreign | Noncontiguous Territories | Total |
| Motor fuel | 32,600 | 4,702 | 37,302 | 33,882 | 5,592 | 39,474 |
| Kerosene | 2,888 | 607 | 3,495 | 1,819 | 713 | 2,532 |
| Distillate fuel oil | 18,281 | 3,012 | 21,293 | 9,753 | 2,436 | 12,189 |
| Residual fuel oil | 9,471 | 3,540 | 13,011 | 8,549 | 4,092 | 12,641 |
| Lubricants: Grease | 391 | 5 | 396 | 390 | 3 | 393 |
| Oil | 12,852 | 144 | 12,996 | 12,427 | 185 | 12,612 |
| Wax | 994 | | 994 | 1,030 | | 1,030 |
| Coke | 2,506 | 15 | 2,521 | 2,441 | 39 | 2,480 |
| Asphalt | 1,483 | 145 | 1,628 | 1,274 | 278 | 1,552 |
| Miscellaneous | 1,293 | 9 | 1,302 | 1,483 | 15 | 1,498 |
| Total | 82,759 | 12,179 | 94,938 | 73,048 | 13,353 | 86,401 |
| Crude petroleum [1] | 39,736 | | 39,736 | 33,069 | | 33,069 |

[1] U. S. Department of Commerce: 1948 final data; 1949 preliminary data.
[2] Bureau of Mines data.

TABLE E–9.—*United States imports of petroleum and products*

[Dollar value]

| | 1949 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | January | February | March | April | May | June | July | August |
| North America: | | | | | | | | |
| Canada | 50,615 | 39,628 | 38,729 | 38,772 | 5,189 | 16,251 | 69,898 | 10,547 |
| Mexico | 485,097 | 815,735 | 1,186,181 | 1,371,428 | 1,322,698 | 1,443,905 | 1,073,038 | 1,249,145 |
| Total | 535,712 | 855,363 | 1,224,910 | 1,410,200 | 1,327,887 | 1,460,156 | 1,142,936 | 1,259,692 |
| South America: | | | | | | | | |
| Netherlands Antilles | 11,536,181 | 8,927,637 | 9,526,269 | 9,884,777 | 8,385,747 | 8,616,694 | 8,476,873 | 8,134,572 |
| Colombia | 2,175,792 | 1,740,731 | 2,768,917 | 2,428,168 | 1,805,679 | 2,628,429 | 1,967,388 | 2,178,283 |
| Venezuela | 21,628,200 | 17,415,083 | 17,314,123 | 19,963,438 | 20,162,950 | 19,326,418 | 20,633,905 | 19,547,561 |
| Trinidad and Tobago | * | | 151,953 | | 154,007 | 452,236 | | 162,427 |
| Argentina | | | | | | | | |
| Total | 35,340,173 | 28,083,451 | 29,761,262 | 32,276,383 | 30,508,383 | 31,023,777 | 31,078,166 | 30,022,843 |
| Europe: | | | | | | | | |
| United Kingdom | 454 | | 2,060 | 244 | 1,260 | 2,989 | 2,700 | 7,293 |
| Netherlands | | | | | | | | |
| Germany | | | | | | | | 80 |
| Switzerland | | | | 280 | 216 | | | 103 |
| Total | 454 | | 2,060 | 524 | 1,476 | 2,989 | 2,700 | 7,476 |
| Middle East: | | | | | | | | |
| Iraq | 505,167 | | | | | | | 308,638 |
| Iran | 1,423,335 | 776,546 | 198,840 | | | | | |
| Kuwait | 3,629,688 | 3,378,069 | 2,720,277 | 2,728,528 | 3,449,182 | 3,386,354 | 2,339,716 | 2,796,853 |
| Saudi Arabia | 2,569,921 | 3,727,004 | 1,863,985 | 1,623,688 | 1,568,124 | 1,599,757 | 1,534,285 | 1,021,159 |
| State of Bahrein | | | 103,261 | 204,756 | | | | |
| Total | 8,128,111 | 7,881,619 | 4,886,363 | 4,556,972 | 5,017,306 | 4,986,111 | 3,874,001 | 4,126,650 |
| Asia and Africa: | | | | | | | | |
| India | | | | | | | | |
| British Malaya | | | 375 | | | | | |
| Indonesia | | | | | 38 | | | |
| Spanish Africa; N. E. S | | | | | | | 2,840 | |
| Total | | | 375 | | 38 | | 2,840 | |
| World total | 44,004,450 | 36,820,433 | 35,874,970 | 38,244,079 | 36,855,090 | 37,473,033 | 36,100,643 | 35,416,661 |

TABLE E–9.—*United States imports of petroleum and products*—Continued

| | 1949 | | | | | 1950 | | |
|---|---|---|---|---|---|---|---|---|
| | September | October | November | December | Total | January | February | March |
| North America: | | | | | | | | |
| Canada | 82,897 | 295,980 | 297,306 | 314,880 | 1,260,692 | 33,834 | 21,821 | 30,946 |
| Mexico | 1,241,406 | 1,874,886 | 1,656,493 | 2,281,384 | 16,001,396 | 2,116,238 | 2,115,002 | 2,522,880 |
| Total | 1,324,303 | 2,170,866 | 1,953,799 | 2,596,264 | 17,262,088 | 2,150,072 | 2,136,823 | 2,553,826 |
| South America: | | | | | | | | |
| Netherlands Antilles | 9,056,374 | 11,495,017 | 10,221,086 | 13,378,842 | 117,640,069 | 13,541,388 | 8,795,560 | 13,801,436 |
| Colombia | 2,191,157 | 2,389,160 | 3,348,232 | 2,236,768 | 27,858,704 | 3,277,554 | 2,771,418 | 3,744,249 |
| Venezuela | 21,635,801 | 25,709,858 | 21,214,523 | 25,777,483 | 250,329,343 | 29,053,546 | 19,631,338 | 26,401,378 |
| Trinidad and Tobago | 516,029 | 177,835 | 433,437 | 203,245 | 2,251,169 | 729,171 | 477,936 | 165,074 |
| Argentina | | | | | | 187 | | |
| Total | 33,399,361 | 39,771,870 | 35,217,278 | 41,596,338 | 398,079,285 | 46,601,846 | 31,676,252 | 44,112,137 |
| Europe: | | | | | | | | |
| United Kingdom | 4,473 | 316 | 3,727 | 7,401 | 32,917 | 7,788 | 193 | 2,856 |
| Netherlands | | | | | | | 441 | |
| Germany | | | | | 80 | | | |
| Switzerland | | | | | 599 | | | |
| Total | 4,473 | 316 | 3,727 | 7,401 | 33,596 | 7,788 | 634 | 2,856 |
| Middle East: | | | | | | | | |
| Iraq | | | | | 813,805 | | | |
| Iran | | | | | 2,398,721 | 186,241 | | |
| Kuwait | 2,882,695 | 3,325,192 | 4,990,734 | 3,182,724 | 38,810,012 | 3,156,482 | 3,164,259 | 2,330,253 |
| Saudi Arabia | 502,635 | 894,130 | 1,156,237 | 1,081,529 | 19,142,454 | 2,229,982 | 1,026,588 | 2,011,945 |
| State of Bahrein | | | | | 308,017 | | | |
| Total | 3,385,330 | 4,219,322 | 6,146,971 | 4,264,253 | 61,473,009 | 5,572,705 | 4,190,847 | 4,342,198 |
| Asia and Africa: | | | | | | | | |
| India | | | 7,008 | | 7,008 | | | |
| British Malaya | | | | | 375 | | | |
| Indonesia | 7,965 | | | 3,075 | 11,078 | | | |
| Spanish Africa N. E. S | | | | | 2,840 | | | |
| Total | 7,965 | | 7,008 | 3,075 | 21,301 | | | |
| World total | 38,121,432 | 46,162,374 | 43,328,783 | 48,467,331 | 476,869,279 | 54,332,411 | 38,004,556 | 51,011,017 |

NOTE.—

| | |
|---|---|
| Total from annual report | $477,706,421 |
| Total by adding monthly reports | 476,869,279 |
| Difference | 837,142 |

Source: U. S. Department of Commerce, Bureau of the Census, Monthly No. FT 120 Reports.

TABLE E–10.—*Petroleum imports into continental United States—Crude and products*

| Year | Crude petroleum | | | Refined products | | |
|---|---|---|---|---|---|---|
| | Total (thousand barrels) | Average daily barrels | Percent of total petroleum imports | Total (thousand barrels) | Average daily barrels | Percent of total petroleum imports |
| 1919 | 52,822 | 144,700 | 97.5 | 1,376 | 3,800 | 2.5 |
| 1920 | 106,175 | 290,100 | 97.6 | 2,647 | 7,200 | 2.4 |
| 1921 | 125,364 | 343,500 | 97.3 | 3,428 | 9,400 | 2.7 |
| 1922 | 127,308 | 348,800 | 93.6 | 8,665 | 23,700 | 6.4 |
| 1923 | 82,015 | 224,700 | 82.3 | 17,638 | 48,300 | 17.7 |
| 1924 | 77,775 | 212,500 | 82.2 | 16,806 | 45,900 | 17.8 |
| 1925 | 61,824 | 169,400 | 79.1 | 16,376 | 44,900 | 20.9 |
| 1926 | 60,382 | 165,400 | 74.3 | 20,938 | 57,400 | 25.7 |
| 1927 | 58,383 | 159,900 | 81.4 | 13,353 | 36,600 | 18.6 |
| 1928 | 79,767 | 218,000 | 87.1 | 11,790 | 32,200 | 12.9 |
| 1929 | 78,933 | 216,200 | 72.6 | 29,777 | 81,600 | 27.4 |
| 1930 | 62,129 | 170,200 | 58.8 | 43,489 | 119,200 | 41.2 |
| 1931 | 47,250 | 129,500 | 54.9 | 38,837 | 106,400 | 45.1 |
| 1932 | 44,682 | 122,100 | 60.0 | 29,812 | 81,400 | 20.0 |
| 1933 | 31,893 | 87,400 | 70.3 | 13,501 | 37,000 | 29.7 |
| 1934 | 35,558 | 97,400 | 70.4 | 14,936 | 40,900 | 29.6 |
| 1935 | 32,239 | 88,300 | 61.3 | 20,396 | 55,900 | 38.7 |
| 1936 | 32,327 | 88,300 | 56.6 | 24,777 | 67,700 | 43.4 |
| 1937 | 27,484 | 75,300 | 48.1 | 29,673 | 81,300 | 51.9 |
| 1938 | 26,412 | 72,400 | 48.6 | 27,896 | 76,400 | 51.4 |
| 1939 | 33,095 | 90,700 | 56.0 | 25,965 | 71,100 | 44.0 |
| 1940 | 42,662 | 116,600 | 50.9 | 41,089 | 112,200 | 49.1 |
| 1941 | 50,606 | 138,700 | 52.1 | 46,536 | 127,500 | 47.9 |
| 1942 | 12,297 | 33,700 | 34.2 | 23,669 | 64,800 | 65.8 |
| 1943 | 13,833 | 37,900 | 21.8 | 49,579 | 135,800 | 78.2 |
| 1944 | 44,805 | 122,400 | 48.6 | 47,451 | 129,700 | 51.4 |
| 1945 | 74,337 | 203,700 | 65.4 | 39,278 | 107,600 | 34.6 |
| 1946 | 86,066 | 235,800 | 62.5 | 51,610 | 141,400 | 37.5 |
| 1947 | 97,532 | 267,200 | 61.2 | 61,857 | 169,500 | 38.8 |
| 1948 | 129,093 | 352,700 | 68.6 | 59,051 | 161,340 | 31.4 |
| 1949 | 154,922 | 424,400 | 66.1 | 79,209 | 217,000 | 33.9 |
| 1950: January–July | 100,176 | 472,530 | 58.0 | 72,507 | 342,000 | 42.0 |
| | Averages by specified periods | | | | | |
| 1919–32 | 76,058 | 208,200 | 80.7 | 18,209 | 49,900 | 19.3 |
| 1933–41 | 34,697 | 95,000 | 56.1 | 27,197 | 74,400 | 43.9 |
| 1942–45 | 36,318 | 99,400 | 47.6 | 39,994 | 109,500 | 52.4 |
| 1946–49 | 116,903 | 320,282 | 65.0 | 62,932 | 172,584 | 35.0 |
| 1950: January–July | 100,176 | 472,530 | 58.0 | 72,507 | 342,000 | 42.0 |

Source: Oil and Gas Division.

TABLE E–11.—*United States oil imports and exports (excluding United States military)*

[Barrels per day]

| Year | Imports | | | Exports | | |
|---|---|---|---|---|---|---|
| | Crude | Products | Total | Crude | Products | Total |
| 1938 | 72,400 | 76,400 | 148,800 | 211,700 | 319,100 | 530,800 |
| 1939 | 90,700 | 71,100 | 161,800 | 197,500 | 320,200 | 517,700 |
| 1940 | 116,500 | 112,300 | 228,800 | 140,700 | 215,800 | 356,400 |
| 1941 | 138,600 | 127,500 | 266,100 | 91,100 | 207,100 | 298,200 |
| 1942 | 33,700 | 64,800 | 98,500 | 92,700 | 227,600 | 320,300 |
| 1943 | 37,900 | 135,800 | 173,700 | 113,300 | 297,600 | 410,800 |
| 1944 | 122,400 | 129,800 | 252,200 | 93,500 | 473,700 | 567,300 |
| 1945 | 203,700 | 107,600 | 311,300 | 90,400 | 410,900 | 501,300 |
| 1946 | 235,800 | 141,400 | 377,200 | 116,300 | 303,200 | 419,500 |
| 1947 | 267,200 | 169,500 | 436,700 | 127,000 | 323,600 | 450,600 |
| 1948 | 352,700 | 160,100 | 512,800 | 108,800 | 259,900 | 368,700 |
| 1949 | 426,027 | 213,699 | 639,726 | 88,767 | 240,000 | 328,767 |

Source: Department of the Interior, Oil and Gas Division, February 1950.

Until the end of the war, the bulk of imports, both crude and products, originated in the Western Hemisphere, primarily in Venezuela, the Netherlands Antilles, and, to a much smaller extent, in Mexico. Since that time, however, increasing quantities of crude have come from the Eastern Hemisphere, from Kuwait and Saudi Arabia. Unless the European market will absorb this Middle East oil, it will probably find its way into this country, especially now that the trans-Arabian pipeline has been completed, and larger quantities can be shipped at lower cost.

Exports have exceeded imports in most years, except the very recent ones. Refined products, rather than crude comprise the bulk of the exports. As was the case with coal, Canada has been the best customer of the United States for petroleum and its products, taking a value of $164,754,643 in 1949. Mexico and Cuba also are commonly substantial importers from the United States, as is Brazil. In 1949 the United Kingdom, France, Italy, India, and Australia were large importers, mostly of refined products from the United States.

FIGURE E–2.

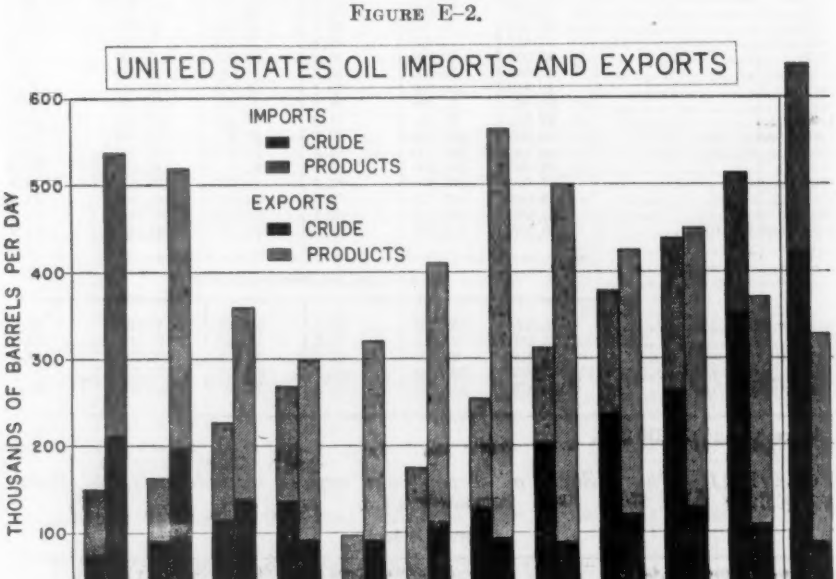


TABLE E–12.— *United States petroleum exports by country of destination*

[Value in dollars]

| Country of destination | 1949 | | | | | | | | | | | | Total from annual report No. FT 420 1949 | 1950 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | January | February | March | April | May | June | July | August | September | October | November | December | | January | February |
| NORTH AMERICA | | | | | | | | | | | | | | | |
| Greenland | | | | | | | | 103 | | | | | 103 | | |
| Canada | 9,754,441 | 8,840,327 | 9,017,477 | 17,257,285 | 14,390,420 | 16,209,090 | 13,922,609 | 19,518,067 | 15,204,563 | 16,591,854 | 13,395,418 | 10,653,092 | 164,754,643 | 9,180,421 | 9,651,505 |
| Newfoundland | 1,365 | 6,504 | 61,232 | 12,910 | 1,716,022 | 1,425 | 334 | 11,140 | 5,231 | 13,294 | 13,000 | 650,537 | 2,492,994 | | |
| Mexico | 2,268,233 | 1,901,810 | 2,591,885 | 2,499,830 | 2,356,186 | 2,446,250 | 2,428,202 | 2,180,422 | 1,977,136 | 2,572,161 | 2,648,192 | 2,400,561 | 28,270,868 | 2,712,045 | 2,776,387 |
| Guatemala | 69,956 | 202,712 | 306,593 | 115,979 | 274,424 | 229,713 | 124,579 | 65,170 | 244,193 | 16,590 | 202,584 | 113,965 | 1,966,458 | 138,497 | 259,633 |
| British Honduras | 19,450 | 23,699 | 15,971 | 32,918 | 10,992 | 5,833 | 17,203 | 11,627 | 6,218 | | 995 | 5,292 | 150,178 | 13,731 | 19,448 |
| El Salvador | 25,591 | 36,009 | 83,945 | 29,621 | 169,716 | 70,477 | 71,720 | 24,580 | 204,425 | 8,190 | 12,763 | 14,677 | 751,714 | 87,052 | 250,153 |
| Honduras | 107,073 | 44,153 | 58,692 | 83,875 | 41,361 | 79,872 | 32,745 | 47,386 | 106,196 | 39,065 | 86,588 | 50,002 | 777,008 | 36,406 | 86,595 |
| Nicaragua | 79,367 | 29,398 | 33,965 | 66,475 | 36,124 | 55,473 | 19,849 | 103,042 | 60,991 | 33,934 | 14,239 | 112,139 | 644,996 | 29,845 | 84,381 |
| Costa Rica | 17,570 | 27,663 | 97,184 | 51,456 | 13,925 | 64,491 | 19,951 | 5,863 | 21,559 | 32,737 | 33,023 | 37,402 | 422,824 | 12,734 | 47,257 |
| Panama | 34,448 | 28,636 | 37,801 | 31,259 | 48,207 | 42,740 | 33,673 | 25,804 | 25,081 | 22,107 | 16,167 | 20,407 | 366,330 | 21,574 | 35,786 |
| Canal Zone | 288,381 | 22,133 | 183,180 | 100,097 | 26,182 | 28,494 | 135,725 | 37,542 | 214,855 | 361,977 | 213,239 | 384,786 | 1,996,591 | 170,377 | 113,960 |
| Bermuda | 9,395 | 364,637 | 13,554 | 10,083 | 19,215 | 7,454 | 240,081 | 209,737 | 15,796 | 25,554 | 7,239 | 17,400 | 940,145 | 237,944 | 154,644 |
| Total | | | | | | | | | | | | | 203,534,852 | | |
| CARIBBEAN AREA | | | | | | | | | | | | | | | |
| Bahamas | 12,500 | 11,976 | 9,967 | 16,340 | 14,284 | 9,771 | 18,785 | 13,707 | 15,040 | 12,522 | 12,883 | 17,032 | 164,807 | 22,314 | 28,567 |
| Cuba | 2,426,730 | 1,403,003 | 1,425,883 | 2,020,229 | 1,822,617 | 1,393,909 | 1,369,042 | 1,710,579 | 1,003,814 | 1,953,631 | 1,683,838 | 1,698,122 | 19,911,397 | 1,839,800 | 1,834,373 |
| Jamaica | 19,722 | 18,783 | 18,166 | 31,823 | 29,363 | 35,356 | 14,847 | 39,108 | 27,968 | 25,567 | 43,605 | 15,277 | 319,585 | 13,642 | 62,402 |
| Haiti | 10,565 | 24,706 | 10,323 | 16,060 | 8,772 | 9,960 | 6,985 | 8,750 | 11,734 | 7,627 | 9,802 | 11,456 | 136,740 | 3,712 | 19,087 |
| Dominican Republic | 51,105 | 37,006 | 48,065 | 34,348 | 24,692 | 10,631 | 25,000 | 21,932 | 25,804 | 57,364 | 42,540 | 41,044 | 419,531 | 40,599 | 53,298 |
| Leeward Windward Islands | 4,441 | 2,781 | 1,563 | 4,067 | 2,081 | 2,684 | 1,014 | 2,807 | 1,782 | 949 | 2,266 | 3,625 | 30,060 | 9,011 | 737 |
| Barbados | 12,978 | 2,337 | 1,701 | 2,827 | 1,709 | 2,887 | 3,289 | 5,082 | 2,747 | 3,723 | 632 | 8,942 | 48,854 | 1,248 | 3,365 |
| Trinidad and Tobago | 42,761 | 40,901 | 41,723 | 42,323 | 469,933 | 17,483 | 22,250 | 12,608 | 540,370 | 19,028 | 29,296 | 512,569 | 1,791,245 | 44,814 | 42,197 |
| Netherlands Antilles | 1,140,960 | 1,948,187 | 467,761 | 41,812 | 62,205 | 1,630,252 | 30,200 | 1,305,433 | 545,595 | 613,095 | 26,389 | 1,117,724 | 8,929,613 | 75,619 | 673,668 |
| French West Indies | 22,365 | 26,865 | 5,666 | 2,221 | 435 | 33,461 | 7,523 | 31,802 | 15,446 | 19,783 | | 21,263 | 186,830 | 25,543 | 33,704 |
| Total | | | | | | | | | | | | | 31,938,662 | | |

TABLE E–12.— *United States petroleum exports by country of destination*— Continued

[Value in dollars]

| Country of destination | 1949 | | | | | | | | | | | | Total from annual report No. FT 420 1949 | 1950 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | January | February | March | April | May | June | July | August | September | October | November | December | | January | February |
| SOUTH AMERICA | | | | | | | | | | | | | | | |
| Colombia | 31, 909 | 178, 430 | 300, 194 | 248, 857 | 197, 279 | 270, 182 | 373, 793 | 268, 972 | 484, 162 | 373, 601 | 408, 972 | 463, 044 | 3, 879, 395 | 478, 222 | 366, 776 |
| Venezuela | 490, 139 | 604, 915 | 574, 868 | 470, 326 | 502, 860 | 384, 120 | 271, 436 | 331, 374 | 535, 114 | 463, 548 | 299, 203 | 436, 477 | 5, 364, 380 | 401, 686 | 423, 216 |
| British Guiana | 19, 816 | 25, 862 | 13, 941 | 8, 515 | 6, 570 | 1, 564 | 2, 804 | 7, 980 | 17, 081 | 4, 369 | 10, 250 | 2, 919 | 121, 671 | 527 | 2, 499 |
| Surinam | 19, 019 | 54, 405 | 2, 141 | 19, 735 | 2, 332 | 2, 140 | 4, 818 | 2, 287 | 8, 018 | 4, 210 | 6, 683 | 6, 700 | 132, 488 | 6, 770 | 21, 541 |
| French Guiana | | | 3, 816 | 1, 316 | | 379 | 1, 029 | | 5, 559 | 6, 651 | 2, 476 | 1, 479 | 22, 993 | 2, 174 | 2, 090 |
| Ecuador | 89, 261 | 37, 038 | 62, 303 | 49, 971 | 51, 271 | 38, 754 | 42, 244 | 51, 873 | 64, 998 | 58, 858 | 33, 204 | 83, 011 | 662, 786 | 44, 967 | 49, 199 |
| Peru | 196, 633 | 1, 180, 546 | 216, 611 | 231, 185 | 136, 275 | 102, 530 | 84, 615 | 997, 872 | 98, 754 | 113, 337 | 48, 560 | 104, 627 | 3, 511, 545 | 76, 570 | 1, 037, 131 |
| Bolivia | 124, 765 | 95, 013 | 33, 378 | 208, 222 | 48, 537 | 31, 827 | 89, 450 | 74, 574 | 45, 260 | 29, 661 | 49, 512 | 77, 885 | 908, 084 | 33, 823 | 161, 844 |
| Chile | 297, 475 | 575, 859 | 254, 397 | 640, 058 | 654, 069 | 386, 854 | 589, 015 | 142, 163 | 214, 184 | 369, 245 | 302, 832 | 655, 134 | 5, 081, 285 | 404, 872 | 303, 501 |
| Brazil | 1, 762, 957 | 2, 137, 939 | 1, 929, 410 | 1, 165, 159 | 1, 400, 690 | 1, 962, 098 | 1, 562, 566 | 882, 325 | 2, 067, 872 | 508, 767 | 529, 988 | 2, 255, 009 | 18, 164, 780 | 718, 034 | 853, 031 |
| Paraguay | 3, 518 | 2, 161 | 60, 770 | 13, 149 | 4, 529 | 15, 708 | 42, 824 | 10, 497 | 105 | | 837 | 56, 735 | 210, 833 | 11, 759 | 1, 418 |
| Uruguay | 327, 353 | 73, 219 | 1, 285, 693 | 53, 188 | 75, 029 | 35, 420 | 278, 430 | 23, 010 | 55, 596 | 46, 122 | 16, 590 | 59, 804 | 1, 995, 897 | 153, 581 | 53, 599 |
| Argentina | 257, 997 | 112, 442 | 138, 560 | 244, 746 | 494, 571 | 506, 006 | 846, 134 | 233, 602 | 399, 283 | 492, 277 | 209, 766 | 214, 549 | 4, 149, 933 | 77, 887 | 74, 730 |
| Total | | | | | | | | | | | | | 44, 206, 070 | | |
| EUROPE | | | | | | | | | | | | | | | |
| Iceland | 637, 917 | 20, 952 | 42, 822 | 40, 068 | 281, 871 | 2, 129 | 12, 766 | 44, 227 | 31, 931 | 19, 619 | 176 | 76, 716 | 1, 211, 194 | 49, 263 | 34, 603 |
| Sweden | 719, 930 | 1, 066, 236 | 1, 204, 942 | 797, 896 | 1, 462, 202 | 674, 423 | 609, 238 | 232, 312 | 1, 305, 506 | 897, 401 | 959, 538 | 567, 675 | 10, 497, 299 | 614, 467 | 1, 198, 056 |
| Norway | 837, 560 | 203, 182 | 702, 973 | 562, 225 | 721, 580 | 384, 227 | 342, 226 | 621, 859 | 469, 796 | 124, 008 | 200, 834 | 210, 409 | 5, 380, 879 | 286, 726 | 133, 127 |
| Denmark | 536, 593 | 1, 023, 416 | 1, 099, 825 | 391, 568 | 179, 154 | 500, 054 | 512, 087 | 680, 754 | 11, 995 | 565, 672 | 313, 671 | 125, 776 | 5, 940, 570 | 879, 605 | 830, 509 |
| United Kingdom | 10, 244, 912 | 8, 503, 775 | 9, 538, 991 | 6, 679, 622 | 7, 486, 616 | 4, 225, 305 | 2, 838, 334 | 5, 303, 500 | 1, 799, 802 | 2, 110, 083 | 3, 222, 113 | 2, 590, 271 | 64, 543, 324 | 2, 245, 163 | 2, 784, 76 |
| Ireland | 680 | 5, 276 | 61, 094 | 7, 917 | 32, 592 | 8, 073 | 390, 859 | 10, 858 | 399, 728 | 30, 039 | 397, 727 | 1, 344, 843 | 16, 664 | 7, 141 | |
| Netherlands | 797, 533 | 183, 970 | 854, 831 | 350, 960 | 676, 698 | 605, 873 | 654, 122 | 934, 380 | 1, 214, 742 | 210, 946 | 512, 768 | 1, 134, 661 | 8, 131, 484 | 328, 003 | 651, 749 |
| Belgium-Luxemburg | 1, 525, 728 | 217, 959 | 594, 038 | 786, 070 | 1, 099, 797 | 620, 931 | 479, 890 | 958, 590 | 305, 252 | 696, 289 | 584, 112 | 847, 391 | 8, 716, 047 | 660, 440 | 650, 951 |
| France | 1, 651, 997 | 3, 677, 701 | 1, 347, 664 | 3, 038, 996 | 2, 924, 709 | 826, 375 | 853, 039 | 329, 090 | 709, 776 | 405, 691 | 1, 152, 856 | 358, 831 | 17, 279, 725 | 114, 343 | 1, 826, 530 |
| Germany | 3, 847 | 725, 177 | 976, 516 | 538, 289 | 1, 097, 194 | 578, 398 | 144, 961 | 132, 964 | 90, 931 | 125, 215 | 55, 543 | 109, 493 | 4, 569, 528 | 80, 763 | 13, 375 |
| Austria | 30, 938 | 44, 640 | 54, 018 | 363, 204 | 327, 772 | 227, 240 | 399, 509 | 81, 858 | 234, 649 | 45, 898 | 7, 767 | 93, 526 | 1, 901, 019 | 4, 689 | 23, 643 |
| Czechoslovakia | | | | | | | 2, 130 | | | | | | 2, 130 | 7, 520 | |
| Switzerland | 169, 553 | 127, 740 | 367, 662 | 372, 783 | 138, 034 | 83, 388 | 243, 801 | 370, 143 | 79, 554 | 240, 718 | 185, 618 | 267, 855 | 2, 646, 899 | 240, 700 | 139, 470 |
| Finland | 56, 841 | 36, 823 | 7, 803 | 5, 764 | 33, 083 | 169, 548 | 32, 357 | 45, 918 | 568 | 10, 724 | 16, 479 | 40, 969 | 456, 877 | 40, 260 | 44, 913 |
| Poland | | | | | | | | 2, 186 | | | | | 2, 186 | | |
| Azores | | | | 2, 948 | 5, 082 | | 123, 460 | | 6, 084 | | | 636 | 141, 158 | 251 | 8, 127 |
| Spain | 2, 948 | | | | | 50, 545 | 582, 587 | 579, 301 | 26, 852 | 192, 975 | 75, 377 | 218, 030 | 3, 100, 219 | 32, 486 | 402, 107 |
| Portugal | 279, 256 | 194, 078 | 374, 489 | 407, 171 | 119, 558 | 271, 188 | 180, 069 | 392, 244 | 76, 163 | 42, 016 | 51, 419 | 42, 716 | 3, 189, 621 | 73, 002 | 201, 668 |
| Gibraltar | 310, 735 | 318, 046 | 496, 837 | 208, 262 | 799, 926 | 1, 924 | 852 | 1, 924 | | | 2, 458 | 12, 138 | 24, 600 | | 1, 685 |
| | 1, 892 | 1, 840 | | 1, 389 | 183 | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spain | 279,256 | 194,078 | 374,435 | 208,262 | 799,926 | 271,188 | 180,069 | 392,244 | | | 2,458 | 12,138 | 24,000 | | |
| Portugal | 310,735 | 318,046 | 496,837 | 1,389 | 183 | 1,924 | 852 | 1,924 | | | | | | | |
| Gibraltar | 1,892 | 1,840 | | | | | | | | | | | | | |
| Malta, Gozo, and Cyprus | 10,610 | 16,982 | 15,514 | 2,550 | 6,901 | 529 | 3,397 | 8,426 | 18,994 | 17,609 | 4,392 | 6,372 | 112,276 | 17,551 | 18,797 |
| Italy | 1,634,996 | 748,720 | 924,435 | 1,641,360 | 378,029 | 1,554,355 | 288,029 | 727,315 | 543,394 | 1,263,745 | 874,512 | 1,839,471 | 12,428,839 | 865,558 | 822,974 |
| Trieste | 8,981 | 2,412 | 21,930 | 67,288 | 4,047 | 44,822 | 10,609 | 228 | | | 112,957 | 2,837 | 276,111 | 13,741 | 45,648 |
| Yugoslavia | | 117,757 | | | 213,845 | 4,125 | 159,732 | 177,815 | 138,417 | | 170,230 | 290,316 | 1,272,237 | 549,109 | 28,251 |
| Albania | | | | 1,162 | 1,671 | | | | | | | | 2,833 | 309,759 | |
| Greece | 372,085 | 309,531 | 323,912 | 245,213 | 126,258 | 192,787 | 433,606 | 573,099 | 326,426 | 378,965 | 23,650 | 257,715 | 3,563,247 | | 371,215 |
| Bulgaria | | | | | | | | | 115 | | | | 115 | | |
| Total | | | | | | | | | | | | | 156,745,260 | | |
| **ASIA** | | | | | | | | | | | | | | | |
| Turkey | 703,380 | 221,707 | 996,345 | 302,307 | 1,245,828 | 144,099 | 275,324 | 428,402 | 157,056 | 462,625 | 79,876 | 125,982 | 5,142,931 | 746,176 | 63,984 |
| Syria | 14,603 | 19,907 | 26,781 | 130 | 16,958 | 16,843 | 441 | 5,977 | 7,854 | 14,066 | 11,546 | 10,254 | 145,360 | 30,873 | 8,630 |
| Lebanon | 29,955 | 35,342 | 69,205 | 54,967 | 31,212 | 11,220 | 57,812 | 68,602 | 44,929 | 74,687 | 58,205 | 35,385 | 571,521 | 55,635 | 75,042 |
| Iraq | 9,021 | 264 | 27,809 | 110,788 | 56,595 | 89,417 | 45,342 | 14,071 | 17,511 | 61,724 | 45,811 | 1,499 | 480,452 | 70,702 | 85,085 |
| Iran | 4,622 | 13,644 | 4,530 | 14,144 | 8,028 | 14,422 | 5,820 | 13,842 | 13,028 | 15,066 | 34,362 | 9,808 | 151,316 | 9,055 | 16,146 |
| Palestine—Israel | 4,843 | 103,193 | 250,389 | 172,501 | 23,507 | 129,795 | 54,661 | 100,436 | 173,553 | 113,711 | 51,992 | 167,029 | 1,345,610 | 99,680 | 39,554 |
| Transjordan | 19,182 | 7,152 | 13,820 | 3,094 | 3,444 | | 876 | 3,814 | 3,975 | | | 4,897 | 60,254 | 1,343 | 16,443 |
| Kuwait | 219,742 | 21,932 | | 447 | 1,773 | 5,165 | 46,488 | 3,885 | 13,178 | 2,771 | 1,280 | 5,352 | 322,013 | 1,412 | 566 |
| Saudi Arabia | 270,063 | 158,034 | 219,597 | 63,858 | 11,692 | 17,871 | 13,664 | 5,574 | 315,063 | 12,524 | 39,159 | 35,718 | 1,162,817 | 25,764 | 50,346 |
| Arabia P. States [1] | | | | | | 1,242 | | | | | | 825 | 2,067 | | |
| Aden | | 1,942 | 2,707 | 2,083 | 1,453 | 33,928 | 3,619 | 1,885 | 1,150 | 3,828 | 3,275 | 8,216 | 30,158 | 6,837 | 491 |
| Bahrein | 213 | 3,268 | 28,360 | 43,813 | 73,814 | 8,114 | 15,743 | 483 | 69,543 | 1,266 | 845,971 | 587 | 1,116,989 | 25,914 | 6,964 |
| Afghanistan | 8,734 | 25,740 | 6,869 | | | 1,359,023 | 1,402,662 | 1,269,016 | 382,847 | 483,765 | 369,410 | 5,336 | 54,793 | | 1,826 |
| India | 2,695,929 | 2,445,758 | 1,780,452 | 2,101,941 | 1,413,081 | 242,335 | 69,383 | 4,921 | 14,521 | 141,183 | 121,535 | 930,724 | 16,605,062 | 827,577 | 537,022 |
| Pakistan | 197,517 | 125,709 | 182,356 | 77,480 | 128,918 | 51,706 | 60,325 | 116,172 | 66,866 | 30,010 | 39,188 | 209,877 | 1,515,735 | 55,643 | 72,170 |
| Ceylon | 86,804 | 71,810 | 98,409 | 59,178 | 113,005 | 39,088 | 15,064 | | 7,457 | 46,992 | 16,813 | 43,607 | 837,080 | 106,063 | 69,482 |
| Burma | 14,227 | 16,266 | 700 | 3,832 | 33,661 | 90,394 | 47,305 | 85,164 | 88,240 | 91,295 | 94,973 | 466 | 194,566 | 27,842 | 2,302 |
| Siam | 83,699 | 89,123 | 32,881 | 49,316 | 66,362 | 16,332 | 83,342 | 115,270 | 222,910 | 189,596 | 52,993 | 88,940 | 907,692 | 255,248 | 225,773 |
| French Indochina | 439,722 | 187,024 | 285,303 | 323,181 | 24,163 | 196,788 | 118,195 | 75,129 | 181,285 | 114,080 | 85,982 | 86,979 | 2,026,815 | 99,621 | 56,785 |
| British Malaya | 183,625 | 90,466 | 829,841 | 98,457 | 123,705 | 282,265 | 286,171 | 243,313 | 223,588 | 364,324 | 202,844 | 124,547 | 2,222,100 | 242,454 | 184,788 |
| Indonesia | 421,563 | 466,816 | 734,283 | 491,900 | 375,207 | 436,550 | 433,318 | 301,257 | 444,190 | 591,019 | 382,404 | 229,404 | 4,321,678 | 454,362 | 443,840 |
| Philippines | 524,597 | 1,472,172 | 468,184 | 1,596,883 | 786,423 | 334 | | | | | | 718,783 | 8,190,434 | 487,552 | 387,997 |
| Portuguese Asia | 4,647 | 1,088 | | | | 10,086 | 15,174 | 141,215 | 57,719 | 43,272 | 76,468 | | 6,069 | | 660 |
| China | 841,457 | 81,521 | 43,029 | 520,967 | 52,494 | 402,754 | | 260 | | | | 358,016 | 2,241,418 | 118,827 | 79,021 |
| Korea | | | 319 | 89,636 | | 86,757 | 61,674 | 164,705 | 148,152 | 237,394 | 347,333 | 1,210 | 494,179 | 685 | 822 |
| Hong Kong | 792,992 | 164,397 | 138,274 | 213,772 | 1,068,600 | 27,031 | 166,675 | 27,906 | 631,328 | 117,483 | 671,163 | 615,081 | 4,039,131 | 342,024 | 172,943 |
| Taiwan | 445,013 | 782,724 | 381,681 | 25,932 | 214,664 | 34,879 | 57,229 | 736,592 | 197,140 | 79,248 | 24,102 | 214,726 | 3,491,662 | 25,984 | 48,954 |
| Japan | 1,276,290 | 344,237 | 540,572 | 27,777 | | | | | | | | 7,089 | 3,539,819 | 28,740 | 6,226 |
| Total | | | | | | | | | | | | | 61,219,721 | | |

See footnotes at end of table, p. 117.

TABLE E–12.— *United States petroleum exports by country of destination*— Continued

[Value in dollars]

| Country of destination | 1949 | | | | | | | | | | | | Total from annual report No. FT 420 1949 | 1950 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | January | February | March | April | May | June | July | August | September | October | November | December | | January | February |
| AUSTRALIA AND OCEANIA | | | | | | | | | | | | | | | |
| Australia | 2,442,715 | 1,712,931 | 2,466,552 | 777,737 | 1,859,032 | 2,042,288 | 1,350,554 | 906,256 | 1,070,266 | 2,764,468 | 598,061 | 1,315,289 | 19,306,149 | 779,772 | 1,150,211 |
| New Guinea | | | | | 17,905 | | 3,150 | | | | | | 21,055 | | |
| New Zealand | 135,852 | 1,114,934 | 546,832 | 165,438 | 264,882 | 145,063 | 170,385 | 274,629 | 382,329 | | 312,692 | 565,346 | 4,298,082 | 201,915 | 265,605 |
| British West Pacific Islands | 72,236 | 14,053 | 175,229 | | | | 38,707 | | 15,125 | 219,700 | 370 | 20,516 | 446,051 | | |
| French Pacific Islands | 30,144 | 615 | 151,856 | 50,173 | 14,704 | 20,960 | 43,754 | 6,641 | 48,659 | 59,642 | | 29,502 | 436,691 | 24,187 | 35,467 |
| West Pacific Islands[1] | | | | 75,199 | 132 | | | | | 14,657 | | | 132 | | |
| Total | | | | | | | | | | | | | 24,508,160 | | |
| AFRICA | | | | | | | | | | | | | | | |
| French Morocco | 166,782 | 224,445 | 718,051 | 759,241 | 68,025 | 526,709 | 316,569 | 229,791 | 576,521 | 265,798 | 39,180 | 53,975 | $3,945,087 | 94,046 | 71,737 |
| Tangier | 9,334 | 12,529 | 18,689 | 27,585 | 7,224 | 29,597 | 19,564 | 26,900 | 7,818 | 39,450 | 15,139 | 14,063 | 227,892 | 14,553 | 7,797 |
| Algeria | 347,512 | 179,801 | 444,925 | 247,789 | 111,244 | 1,025,355 | 488,787 | 107,725 | 547,832 | 127,835 | 249,827 | 71,002 | 3,949,634 | 135,526 | 65,541 |
| Tunisia | 162,247 | 69,856 | 189,264 | 257,681 | 36,962 | 119,034 | 143,448 | 5,488 | 271,384 | 42,744 | 6,858 | 51,725 | 1,356,691 | 39,213 | 47,629 |
| Libya | | | | 184 | | | | | | 1,250 | 2,089 | 3,181 | 7,179 | 2,302 | |
| Egypt | 342,236 | 248,496 | 207,534 | 308,232 | 105,174 | 118,737 | 165,119 | 234,394 | 276,870 | 537,138 | 363,595 | 382,722 | 3,290,247 | 191,344 | 294,376 |
| Anglo Egyptian Sudan | 2,244 | 567 | 4,918 | 1,896 | 1,093 | 5,323 | 216 | 1,174 | 1,540 | 11,953 | 2,777 | 9,711 | 43,412 | 4,979 | 6,319 |
| Canary Islands | 5,592 | 243 | | | 239,118 | 1,199 | 6,645 | 1,700 | 5,645 | 11,652 | 7,537 | 1,071 | 280,402 | 4,364 | 8,982 |
| Spanish Africa[1] | | 3,259 | | | | | | 254 | 180 | 16,939 | 542 | 988 | 22,162 | 132 | 2,975 |
| Cameroon | 29,692 | 19,155 | 47,437 | 25,353 | 32,028 | 67,971 | 7,018 | 8,937 | 56,478 | 10,812 | 494 | 34,312 | 339,687 | 130,594 | 21,757 |
| French Equatorial Africa | 48,173 | 3,514 | 503,502 | 44,469 | 67,430 | 30,546 | 45,756 | 15,310 | 35,744 | 62,502 | 5,061 | 33,130 | 895,137 | 72,502 | 13,478 |
| French West Africa | 430,665 | 136,690 | 196,777 | 109,613 | 80,168 | 97,321 | 298,785 | 59,770 | 146,369 | 509,126 | 123,048 | 174,275 | 2,362,607 | 222,670 | 132,468 |
| Gold Coast | 13,118 | 212,066 | 45,807 | 29,536 | 62,688 | 77,683 | 46,150 | 70,867 | 21,659 | 81,334 | 28,639 | 25,866 | 715,413 | 1,073 | 106,350 |
| Nigeria | 23,254 | 22,859 | 21,801 | 72,794 | 34,479 | 48,733 | 35,622 | 20,006 | 48,367 | 58,184 | 13,188 | 95,032 | 494,319 | 56,095 | 37,968 |
| British West Africa[1] | 102,491 | 1,059 | 227,704 | 13,092 | 2,753 | 14,520 | 2,192 | 3,380 | 4,755 | 109 | | 10,132 | 382,187 | 438 | 14,778 |
| Maderia Islands | 107 | 700 | 970 | 832 | 832 | 328 | 1,342 | | | | 504 | | 5,615 | | 3,554 |
| Angola | 6,697 | 18,435 | 12,320 | 49,629 | 22,180 | 32,485 | 27,646 | 80,314 | 61,630 | 53,821 | 36,829 | 48,914 | 450,900 | 17,171 | 52,707 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Angola | 6,697 | 18,435 | 12,320 | 49,629 | 22,180 | 32,485 | 27,646 | 80,314 | 61,630 | 53,821 | 36,829 | 48,914 | 450,900 | 17,171 | 52,707 |
| Port Guinea [1] | 2,518 | 641 | 1,658 | 2,482 | | 753 | 3,911 | 1,372 | | | | 2,798 | 16,113 | 1,157 | 7,158 |
| Liberia | 6,839 | 2,261 | 14,866 | 7,697 | 2,378 | 5,348 | 7,849 | 9,852 | 8,713 | 101,600 | 4,949 | 9,153 | 181,505 | 8,611 | 17,411 |
| Belgian Congo | 119,110 | 45,512 | 66,936 | 147,869 | 552,608 | 108,788 | 94,204 | 70,824 | 115,004 | 315,517 | 49,463 | 67,250 | 1,753,085 | 72,777 | 94,212 |
| East Italian Africa | 7,270 | 1,269 | 5,950 | 1,057 | 790 | 2,195 | 209 | 2,960 | 1,014 | 4,919 | 1,238 | 183 | 29,054 | | 713 |
| Ethiopia | 2,846 | 2,722 | 527 | | 1,277 | 4,891 | | 5,593 | 3,541 | 495 | 4,801 | | 94,462 | 2,834 | 2,767 |
| French Somaliland | | | | 171 | | | 291 | 6,941 | 139 | 3,698 | | 747 | 11,987 | 142 | 3,857 |
| Mauritius and Dependencies | 2,964 | | 3,655 | 17,715 | 17,319 | 567 | 654 | 7,043 | 734 | 925 | 52,341 | 14,542 | 129,055 | 13,095 | 1,616 |
| British East Africa | 172,548 | 71,926 | 412,085 | 186,908 | 194,513 | 301,842 | 69,313 | 242,899 | 208,390 | 97,026 | 19,843 | 156,635 | 2,133,928 | 287,649 | 86,910 |
| Mozambique | 197,365 | 205,816 | 259,169 | 469,772 | 220,369 | 320,233 | 402,265 | 363,999 | 386,376 | 270,287 | 75,913 | 220,577 | 3,392,141 | 251,650 | 242,373 |
| Madagascar | 2,240 | | 31,855 | 17,926 | 9,589 | 117,740 | 13,775 | 6,706 | | | 99,614 | 71,706 | 371,151 | 140,269 | 14,479 |
| Union of South Africa | 1,058,615 | 668,297 | 1,360,314 | 1,285,943 | 1,092,566 | 1,013,508 | 1,042,444 | 729,379 | 928,885 | 1,116,049 | 605,910 | 1,035,268 | 11,868,603 | 1,064,271 | 1,128,830 |
| Northern Rhodesia | 176 | 8,761 | | | | | | 945 | | 9,556 | 1,995 | | 21,433 | 1,418 | |
| Southern Rhodesia | 50,217 | 16,879 | 51,521 | 34,078 | 26,247 | 16,255 | 143,114 | 62,246 | 7,274 | 10,093 | 23,293 | 51,907 | 493,124 | 40,615 | 43,803 |
| Total | | | | | | | | | | | | | 39,264,212 | | |
| WORLD TOTAL | | | | | | | | | | | | | | | |
| North America | 12,675,270 | 11,527,681 | 12,501,479 | 20,291,788 | 19,102,774 | 19,241,312 | 17,046,671 | 22,240,483 | 18,086,244 | 19,720,463 | 16,643,447 | 14,460,260 | 203,534,852 | 12,640,626 | 13,479,749 |
| Caribbean area | 3,744,127 | 3,516,545 | 2,030,818 | 2,212,050 | 2,436,091 | 3,146,394 | 1,498,935 | 3,151,808 | 2,190,300 | 2,713,289 | 1,851,251 | 3,447,054 | 31,938,662 | 2,076,302 | 2,751,398 |
| South America | 3,620,842 | 5,077,829 | 4,876,082 | 3,354,427 | 3,574,012 | 3,737,582 | 4,189,158 | 3,234,529 | 3,995,986 | 3,526,250 | 1,918,873 | 4,417,373 | 44,206,070 | 2,410,872 | 3,350,575 |
| Europe | 19,835,537 | 17,546,213 | 18,949,202 | 16,565,822 | 18,092,177 | 11,050,758 | 8,904,874 | 12,588,992 | 7,401,805 | 7,750,302 | 8,556,509 | 9,782,531 | 156,745,260 | 7,430,063 | 10,239,308 |
| Asia | 9,293,040 | 6,951,236 | 7,162,696 | 6,448,384 | 5,901,618 | 3,721,407 | 3,336,307 | 3,927,891 | 3,483,083 | 3,291,929 | 3,656,685 | 4,040,337 | 61,219,721 | 4,146,013 | 2,653,864 |
| Australia and Oceana | 2,680,947 | 2,842,533 | 3,340,469 | 1,068,547 | 2,156,655 | 2,208,311 | 1,606,550 | 1,187,526 | 1,516,379 | 3,058,467 | 911,123 | 1,930,653 | 24,508,160 | 1,005,874 | 1,451,283 |
| Africa | 3,312,852 | 2,177,758 | 4,848,235 | 4,119,544 | 2,989,054 | 4,087,641 | 3,382,888 | 2,376,769 | 3,722,862 | 3,760,812 | 1,834,667 | 2,640,865 | 39,264,212 | 2,871,490 | 2,532,545 |
| World total | 55,162,615 | 49,639,795 | 53,708,981 | 54,060,622 | 54,252,381 | 47,193,405 | 39,965,383 | 48,707,998 | 40,396,659 | 43,821,512 | 35,372,555 | 40,719,073 | 561,416,937 | 32,581,240 | 36,458,722 |
| Total from monthly report Ft. 420 | | | | | | | | | | | | | 563,000,979 | | |
| Difference | | | | | | | | | | | | | 1,684,042 | | |

[1] Not elsewhere specified.

Source: Department of Commerce, Bureau of the Census, Report No. FT 420.

### 3. Industry Facilities

The physical structures of the several fuel and energy-producing industries differ greatly among themselves. Coal, for instance, reaches the ultimate consumer in its raw stage—after some washing, cleaning, and sorting. Petroleum, on the other hand, is something quite unfamiliar to the motorist. His product is gasoline, the result of highly complex refining processes. While electric-power plants may operate in almost every city and town, requiring as a rule only local distribution lines, natural gas comes from afar to most markets, requiring long expensive pipelines.

These structural differences, coupled with the wide variation in geographic occurrence of the fuels, result in largely dissimilar patterns of physical operation and ownership-management.

*Coal mines.*

Over 9,000 bituminous coal and lignite mines in the United States in 1948 produced almost 600,000,000 net tons of coal. In addition, there is an unknown and varying number of mines producing less than 1,000 tons of coal a year.

The largest number of the smallest among the listed mines is in Kentucky and the remainder of the Appalachian coal-mining region. These same States also have the bulk of the largest mines. Only in Indiana and Illinois are the largest mines, with production of 500,000 tons of coal or over, of numerical importance, constituting 20 percent of total mines. In most States the smallest—less than 10,000 ton—class is the preponderant size, accounting for more than half the total number of mines.

Nation-wide, almost one-half of the mines (47.1 percent) belong to this small-size class. Together, they produced in 1948, 3.3 percent of the total coal output. On the other end of the size classes, the group of largest mines—2.9 percent of the total number of mines—produced 38 percent of the coal. Taking the two largest classes of mines together, this group of 8.3 percent of all mines produced almost two-thirds of all coal. The two smallest groups of mines, more than three-fourths of all mines, produced less than one-seventh of the coal.

Table F–1.—*Salient trends in bituminous-coal and lignite mining industry in the United States, 1941–49*

| | 1941 | 1942 | 1943 | 1944 |
|---|---|---|---|---|
| Number of active mines of commercial size: | | | | |
| Class 1 (200,000 tons or more)—number | 730 | 811 | 855 | 828 |
| Class 2 (100,000 to 200,000 tons)—do | 437 | 484 | 464 | 559 |
| Class 3 (50,000 to 100,000 tons)—do | 402 | 445 | 481 | 540 |
| Class 4 (10,000 to 50,000 tons)—do | 1,305 | 1,492 | 1,544 | 1,776 |
| Class 5 (1,000 to 10,000 tons)—do | 3,948 | 3,740 | 3,276 | 3,225 |
| Total number 1,000 tons and over | 6,822 | 6,972 | 6,620 | 6,928 |

| | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|
| Number of active mines of commercial size: | | | | | |
| Class 1 (200,000 tons or more)—number | 753 | 706 | 801 | 755 | 547 |
| Class 2 (100,000 to 200,000 tons)—do | 591 | 560 | 618 | 580 | 497 |
| Class 3 (50,000 to 100,000 tons)—do | 629 | 637 | 704 | 768 | 666 |
| Class 4 (10,000 to 50,000 tons)—do | 1,920 | 2,016 | 2,665 | 2,697 | 2,148 |
| Class 5 (1,000 to 10,000 tons)—do | 3,140 | 3,414 | 3,912 | 4,279 | 4,701 |
| Total number 1,000 tons and over | 7,033 | 7,333 | 8,700 | 9,079 | 8,559 |

Source: Bureau of Mines.

TABLE F–2.—*Number and production of bituminous-coal and lignite mines in the United States, classified by size of output in each State, in 1949*

[Exclusive of mines producing less than 1,000 tons]

| State | Class 1A—500,000 tons and over | | | | Class 1B—200,000 to 500,000 tons | | | | Class 2—100,000 to 200,000 tons | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mines | | Production | | Mines | | Production | | Mines | | Production | |
| | Number | Percent | Net tons | Percent | Number | Percent | Net tons | Percent | Number | Percent | Net tons | Percent |
| Alabama | 3 | 0.7 | 1,852,268 | 14.3 | 11 | 2.6 | 3,549,698 | 27.5 | 20 | 4.7 | 2,783,255 | 21.5 |
| Alaska | | | | | | | | | 2 | 28.6 | 334,759 | 77.2 |
| Arizona | | | | | | | | | | | | |
| Arkansas | | | | | | | | | | | | |
| Colorado | | | | | 2 | 1.2 | 694,306 | 15.0 | 9 | 5.2 | 1,258,393 | 27.1 |
| Idaho | | | | | | | | | | | | |
| Illinois | 35 | 11.7 | 28,344,765 | 60.0 | 38 | 12.7 | 13,512,502 | 28.6 | 10 | 3.3 | 1,393,788 | 3.0 |
| Indiana | 6 | 5.1 | 4,294,329 | 25.9 | 27 | 23.1 | 9,359,717 | 56.6 | 9 | 7.7 | 1,184,413 | 7.2 |
| Iowa | | | | | 1 | .8 | 220,272 | 12.7 | 1 | .8 | 129,638 | 7.5 |
| Kansas | | | | | 4 | 7.4 | 1,358,121 | 66.9 | 3 | 5.6 | 408,561 | 20.1 |
| Kentucky | 16 | .7 | 13,292,818 | 21.2 | 48 | 2.0 | 13,542,240 | 21.6 | 79 | 3.3 | 10,907,483 | 17.5 |
| Maryland | | | | | | | | | 1 | 1.3 | 130,911 | 19.6 |
| Michigan | | | | | | | | | | | | |
| Missouri | 2 | 2.2 | 1,530,872 | 42.0 | 3 | 3.3 | 1,082,490 | 29.7 | 2 | 2.2 | 253,343 | 6.9 |
| Montana (bituminous) | 1 | 5.5 | 1,819,342 | 66.9 | 1 | 5.5 | 389,782 | 14.3 | 2 | 11.1 | 306,472 | 11.3 |
| California, Montana, North Dakota, South Dakota, and Texas (lignite) | 1 | 1.8 | 512,398 | 16.6 | 6 | 10.9 | 1,965,337 | 63.6 | | | | |
| New Mexico | | | | | 2 | 11.1 | 666,939 | 66.4 | | | | |
| Ohio | 12 | 1.8 | 9,545,652 | 30.8 | 19 | 2.8 | 6,214,277 | 20.1 | 35 | 5.3 | 4,917,316 | 15.9 |
| Oklahoma | | | | | 4 | 5.3 | 1,010,342 | 33.4 | 5 | 6.6 | 840,733 | 27.8 |
| Pennsylvania | 35 | 1.9 | 28,502,248 | 32.0 | 53 | 2.8 | 16,678,213 | 18.7 | 101 | 5.3 | 14,051,088 | 15.7 |
| Tennessee | | | | | 2 | 1.3 | 443,854 | 10.6 | 11 | 7.0 | 1,426,023 | 34.2 |
| Utah | 4 | 5.8 | 2,783,874 | 45.2 | 5 | 7.2 | 1,690,683 | 27.4 | 6 | 8.7 | 909,818 | 14.8 |
| Virginia | 4 | 1.2 | 2,737,344 | 18.8 | 13 | 3.9 | 3,899,537 | 26.7 | 21 | 6.3 | 3,028,866 | 20.8 |
| Washington | | | | | | | | | 3 | 9.7 | 467,756 | 52.0 |
| West Virginia | 41 | 2.9 | 30,214,422 | 24.6 | 139 | 9.8 | 41,392,591 | 33.8 | 171 | 12.1 | 24,740,493 | 20.2 |
| Wyoming | 4 | 8.7 | 2,795,440 | 46.6 | 5 | 10.9 | 1,864,651 | 31.1 | 6 | 13.0 | 915,689 | 15.2 |
| Other States: Georgia and North Carolina | | | | | | | | | | | | |
| Total, 1949 | 164 | 1.9 | 128,225,772 | 29.3 | 383 | 4.5 | 119,535,552 | 27.3 | 497 | 5.8 | 70,388,798 | 16.1 |

TABLE F-2.—*Number and production of bituminous-coal and lignite mines in the United States, classified by size of output in each State, in 1949*—Continued

[Exclusive of mines producing less than 1,000 tons]

| State | Class 3—50,000 to 100,000 tons | | | | Class 4—10,000 to 50,000 tons | | | | Class 5—Less than 10,000 tons | | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mines | | Production | | Mines | | Production | | Mines | | Production | | Mines | Production (net ton) | |
| | Number | Percent | Net tons | Percent | Number | Percent | Net tons | Percent | Number | Percent | Net tons | Percent | | Total | Average per mine |
| Alabama | 30 | 7.0 | 2,125,967 | 16.4 | 69 | 16.2 | 1,608,807 | 12.5 | 293 | 68.8 | 1,013,835 | 7.8 | 426 | 12,933,830 | 30,361 |
| Alaska | 1 | 14.3 | 57,451 | 13.3 | 1 | 14.3 | 23,670 | 5.4 | 3 | 42.8 | 17,653 | 4.1 | 7 | 433,533 | 61,933 |
| Arizona | | | | | | | | | 1 | 100.0 | 4,850 | 100.0 | 1 | 4,850 | 4,850 |
| Arkansas | 5 | 8.9 | 293,999 | 30.6 | 19 | 33.9 | 564,655 | 58.7 | 32 | 57.2 | 102,857 | 10.7 | 56 | 961,511 | 17,170 |
| Colorado | 19 | 11.1 | 1,316,012 | 28.4 | 41 | 24.0 | 1,005,999 | 21.7 | 100 | 58.5 | 361,722 | 7.8 | 171 | 4,636,432 | 27,114 |
| Idaho | | | | | | | | | 1 | 100.0 | 3,219 | 100.0 | 1 | 3,219 | 3,219 |
| Illinois | 25 | 8.4 | 1,640,717 | 3.5 | 85 | 28.4 | 1,873,557 | 4.0 | 106 | 35.5 | 442,630 | .9 | 299 | 47,207,959 | 157,886 |
| Indiana | 12 | 10.2 | 901,273 | 5.4 | 25 | 21.4 | 662,194 | 4.0 | 38 | 32.5 | 147,830 | .9 | 117 | 16,549,756 | 141,451 |
| Iowa | 2 | 1.7 | 131,932 | 7.7 | 47 | 38.8 | 922,658 | 53.5 | 70 | 57.9 | 319,984 | 18.6 | 121 | 1,724,484 | 14,252 |
| Kansas | | | | | 6 | 11.1 | 99,122 | 4.9 | 41 | 75.9 | 165,313 | 8.1 | 54 | 2,031,117 | 37,613 |
| Kentucky | 93 | 4.0 | 6,699,180 | 10.7 | 372 | 15.8 | 8,521,435 | 13.6 | 1,752 | 74.2 | 9,620,108 | 15.4 | 2,360 | 62,583,264 | 26,518 |
| Maryland | 2 | 2.6 | 148,463 | 22.2 | 10 | 13.0 | 194,728 | 29.1 | 64 | 83.1 | 194,230 | 29.1 | 77 | 668,332 | 8,680 |
| Michigan | | | | | 1 | 100.0 | 11,450 | 100.0 | | | | | 1 | 11,450 | 11,450 |
| Missouri | 4 | 4.5 | 281,428 | 7.7 | 11 | 12.2 | 226,945 | 6.2 | 68 | 75.6 | 272,378 | 7.5 | 90 | 3,647,456 | 40,527 |
| Montana (bituminous) | 1 | 5.6 | 94,732 | 3.5 | 3 | 16.7 | 65,760 | 2.4 | 10 | 55.6 | 44,847 | 1.6 | 18 | 2,720,935 | 151,163 |
| California, Montana, North Dakota, South Dakota, and Texas (lignite) | 3 | 5.5 | 214,316 | 6.9 | 12 | 21.8 | 257,136 | 8.3 | 33 | 60.0 | 142,943 | 4.6 | 55 | 3,092,130 | 56,221 |
| New Mexico | 3 | 16.7 | 205,001 | 20.4 | 5 | 27.8 | 103,983 | 10.4 | 8 | 44.4 | 28,111 | 2.8 | 18 | 1,004,034 | 55,780 |
| Ohio | 57 | 8.6 | 4,144,207 | 13.4 | 204 | 30.7 | 4,860,444 | 15.7 | 338 | 50.8 | 1,278,641 | 4.1 | 665 | 30,960,537 | 46,557 |
| Oklahoma | 9 | 11.8 | 606,605 | 20.1 | 17 | 22.4 | 428,622 | 14.2 | 41 | 53.9 | 135,557 | 4.5 | 76 | 3,021,859 | 39,761 |
| Pennsylvania | 172 | 9.1 | 12,227,158 | 13.7 | 618 | 32.7 | 13,825,423 | 15.5 | 910 | 48.2 | 3,930,473 | 4.4 | 1,889 | 89,214,603 | 47,228 |
| Tennessee | 19 | 12.2 | 1,402,853 | 33.6 | 21 | 13.5 | 506,808 | 12.2 | 103 | 66.0 | 392,734 | 9.4 | 156 | 4,172,272 | 26,745 |
| Utah | 3 | 4.3 | 214,724 | 3.5 | 21 | 30.5 | 446,236 | 7.2 | 30 | 43.5 | 114,257 | 1.9 | 69 | 6,159,592 | 89,269 |
| Virginia | 23 | 6.9 | 1,700,954 | 11.7 | 103 | 30.7 | 2,118,217 | 14.5 | 171 | 51.0 | 1,099,169 | 7.5 | 335 | 14,584,087 | 43,535 |
| Washington | 1 | 3.2 | 76,653 | 8.6 | 14 | 45.2 | 304,985 | 33.9 | 13 | 41.9 | 49,652 | 5.5 | 31 | 899,046 | 29,001 |
| West Virginia | 180 | 12.8 | 12,934,914 | 10.5 | 435 | 30.9 | 11,121,484 | 9.1 | 444 | 31.5 | 2,206,674 | 1.8 | 1,410 | 122,610,578 | 86,958 |
| Wyoming | 2 | 4.4 | 173,347 | 2.9 | 7 | 15.2 | 175,844 | 2.9 | 22 | 47.8 | 75,953 | 1.3 | 46 | 6,000,924 | 130,455 |
| Other States: Georgia and North Carolina | | | | | 1 | 10.0 | 13,646 | 45.1 | 9 | 90.0 | 16,600 | 54.9 | 10 | 30,246 | 3,025 |
| Total, 1949 | 666 | 7.8 | 47,591,886 | 10.9 | 2,148 | 25.1 | 49,943,808 | 11.4 | 4,701 | 54.9 | 22,182,220 | 5.0 | 8,559 | 437,868,036 | 51,159 |

*Oil industry*

*Oil wells.*—Although more than half of the States produce some oil, Texas, with one-quarter of all wells, produces about half of the domestic crude oil output. Pennsylvania, Oklahoma, Kansas, and Illinois and California, in 1947, ranked next, in that order. The number of wells, because of the difference in production per well, is no indication of the total production of the State. Texas wells, on the average, in 1947, produced over 50 times more oil daily than Pennsylvania wells. The latter, located on old rather exhausted fields, produce largely through secondary recovery methods. The physical state of the oil field from which a well produces, is not the only factor which determines production per well. Most oil-producing States have some form of production controls for the purpose, avowedly, of promoting conservation of an exhaustive resource. The quotas set either by State authority or by voluntary agreements of the producers are therefore the chief limits on production in flush fields.

TABLE F–3.—*Producing oil wells in the United States and average production per day in 1948, by States and districts*

| State and district | Producing oil wells | | State and district | Producing oil wells | |
|---|---|---|---|---|---|
| | Approximate number, Dec. 31 | Average production per well per day (barrels) | | Approximate number, Dec. 31 | Average production per well per day (barrels) |
| Arkansas | 3,670 | 23.8 | New York | 23,100 | 0.6 |
| California | 26,460 | 36.5 | Ohio | 20,000 | .5 |
| Colorado | 700 | 75.1 | Oklahoma | 53,000 | 8.0 |
| Illinois | 26,500 | 6.8 | Pennsylvania | 82,000 | .4 |
| Indiana | 2,780 | 7.5 | | | |
| Kansas | 27,900 | 10.9 | Texas: | | |
| Kentucky | 14,750 | 1.6 | Gulf Coast | 15,600 | 48.8 |
| | | | West Texas | 23,600 | 33.7 |
| Louisiana: | | | East Texas proper | 22,900 | 13.3 |
| Gulf Coast | 4,170 | 93.3 | Other districts | 51,000 | 13.3 |
| Northern | 5,600 | 22.9 | | | |
| | | | Total Texas | 113,100 | 22.4 |
| Total Louisiana | 9,770 | 53.7 | West Virginia | 16,000 | .5 |
| Michigan | 3,550 | 13.0 | Wyoming | 4,600 | 33.7 |
| Mississippi | 1,320 | 102.5 | Other States [1] | 160 | 15.6 |
| Montana | 3,100 | 8.6 | | | |
| Nebraska | 50 | 10.7 | Total United States | 437,880 | 12.8 |
| New Mexico | 5,370 | 25.3 | | | |

[1] Alabama, Florida, Missouri, Tennessee, Utah, and Virginia.

Source: U. S. Bureau of Mines.

TABLE F–4.—*Number of producing oil wells and production per well*

| | Oil wells producing year end [1] | Production per well barrels daily [2] | | Oil wells producing year end [1] | Production per well barrels daily [2] |
|---|---|---|---|---|---|
| Year: | | | Year: | | |
| 1918 | 203,375 | 4.8 | 1934 | 333,070 | 7.5 |
| 1919 | 227,000 | 4.8 | 1935 | 340,990 | 8.1 |
| 1920 | 261,000 | 5.1 | 1936 | 349,450 | 8.7 |
| 1921 | 274,500 | 4.9 | 1937 | 363,030 | 9.8 |
| 1922 | 284,880 | 5.5 | 1938 | 369,640 | 9.1 |
| 1923 | 290,100 | 7.0 | 1939 | 380,390 | 9.2 |
| 1924 | 299,100 | 6.6 | 1940 | 389,010 | 9.6 |
| 1925 | 306,100 | 6.9 | 1941 | 399,960 | 9.7 |
| 1926 | 318,600 | 6.8 | 1942 | 404,840 | 9.4 |
| 1927 | 323,300 | 7.7 | 1943 | 407,170 | 10.2 |
| 1928 | 327,800 | 7.6 | 1944 | 412,220 | 11.2 |
| 1929 | 328,200 | 8.4 | 1945 | 415,750 | 11.3 |
| 1930 | 331,070 | 7.5 | 1946 | 421,460 | 11.3 |
| 1931 | 315,850 | 7.2 | 1947 | 426,280 | 12.0 |
| 1932 | 321,500 | 6.7 | 1948 | 435,000 | 12.8 |
| 1933 | 326,850 | 7.7 | 1949 | | |

[1] Petroleum Industry Record, 1918–48.
[2] Calculated.

*Pipelines.*—The means of transporting crude oil prevalent is by pipeline. Where a refinery operates in or close to a producing oil field, gathering lines are the only necessary link between well and still. Where refineries are located at great distances from the producing fields, large diameter trunk pipelines form the most economic bond. About three-fourths of all crude oil received at refineries arrives there by pipelines. Only the large east coast refineries, which receive much of their crude supply from the Gulf coast, employ tankers for crude shipments. Overseas shipments, of course, come by oceangoing tankers. Railroad tankcars and tank trucks carry only very minor amounts of crude oil.

Crude-oil lines up to 24 inches in diameter are adding to the efficiency of trunk systems connecting the fields of the Southwest to the refining centers of the Middle West and East. The Big Inch lines, with their specially designed pumping equipment, are establishing new standards in operation, and eventually there will be general replacement of the 6-, 8-, and 10-inch lines on which the industry's transportation was founded and expanded for many years.

One of the largest crude pipelines completed in 1948 was that of Magnolia Pipe Line Co. It is a 20-inch line from Corsicana, Tex., to Patoka, Ill., a distance of 648 miles, and has a daily capacity of 100,000 barrels. Of special significance is the simplicity of the station design, coupled with efficient and reliable operation. The entire line is operated as a closed system, with oil movements directed by the chief dispatcher using telephone communication exclusively. This and other 1948 crude-oil pipeline construction projects provided a significantly increased capacity to transport oil from southwestern producing fields to refineries in the Great Lakes region. By this means a condition of scarcity of crude-oil supplies that developed in 1947 as a result of declining local production and rapidly growing consumption of refined products in the area was eliminated.

A decided trend toward construction of products pipelines by many oil companies has been evident in recent years to facilitate distribution of refined petroleum products to markets. A typical example is the

2,800-mile products line system of Sinclair Refining Co. from Houston, Tex., to Marcus Hook, Pa. The system is so designed that the direction of flow in certain portions of the line may be reversed at will to balance efficiently variations in demand for products, due to seasonal and other factors, and the supply from refining centers.

The reasons for this pattern are economic. Pipelines are the cheapest and most efficient method of carrying crude oil across the country. Where coastwise shipping is involved, the flexibility of tankers, coupled with competitively low costs, makes them preferable. Inland barges are employed to some extent when waterways can provide transportation in the required direction.

But for refined products, on their road to points of consumption, the pattern and the economics are slightly different. While pipelines again are the cheapest method of transportation, the variety of products to be distributed and the smaller quantities traveling toward different directions do not always lend themselves to the established course of a pipeline. This statement is the more applicable the closer a refinery is located to large markets for its products. It is less applicable to the Texas and Mid-Continent refineries, which ship their products through long refined products pipelines to the Great Lakes' market area. Greater proportions of refined products—than of crude oil—however, travel by railroad tank car and by tank truck, especially on shorter, intercity runs.

TABLE F–5.—*Summary of selected data of pipeline companies for the years 1942–48*

| Year | Number of companies | Mileage operated | | Oil transported | Number of barrel-miles | |
|---|---|---|---|---|---|---|
| | | Gathering | Trunk | | Crude | Refined |
| | | | | *Millions of barrels* | *Millions of miles* | *Millions of miles* |
| 1942 | 69 | 42,318 | 64,167 | 1,779 | 346,051 | 38,422 |
| 1943 | 74 | 42,471 | 66,312 | 2,080 | 393,029 | 60,896 |
| 1944 | 75 | 43,276 | 68,339 | 2,398 | 437,679 | 70,916 |
| 1945 | 74 | 43,994 | 69,357 | 2,379 | 429,942 | 65,360 |
| 1946 | 70 | 44,862 | 71,682 | 2,272 | 428,843 | 58,752 |
| 1947 | 71 | 45,909 | 73,389 | 2,481 | 465,503 | 71,554 |
| 1948 | 74 | 47,036 | 77,056 | 2,719 | 513,497 | 85,087 |

Source: Statistics of oil pipeline companies reporting to the Interstate Commerce Commission for the year ended Dec. 31, 1948.

*Refineries.*—The long-term trend has been toward larger plant capacity, and toward more complex processes, primarily toward various types of cracking facilities, chiefly catalytic cracking during the last decade. For instance, in 1920, the 373 existing refineries had a daily crude oil throughput capacity of 1,530,565 barrels. This is an average daily capacity of 4,103 barrels. In 1928 the 551 refineries had a capacity of crude oil throughput of 4,351,151 barrels daily, for an average of 7,897 barrels a day. By January 1, 1950, this average capacity had risen to more than twice that, or 18,246 barrels daily. Refinery sizes range from about 50 barrels a day to 250,000. It is interesting to note that the average capacity of the shut-down plants on that date was 10,070 daily barrels, while that of the plants in operation was 19,448. The largest and most modern refineries are located near the coasts in Pennsylvania and New Jersey, in Texas and Louisiana, in California, as well as in Indiana and Illinois. More than three-fourths of the cracking facilities are located in these States.

TABLE F–6.—*Summary of refineries by years, 1914–50*

[Barrels per day]

| Date | Number | | | | Crude-oil throughput capacity | | | |
|---|---|---|---|---|---|---|---|---|
| | Operating | Shutdown | Total | Building | Operating | Shutdown | Total | Building |
| Jan. 1, 1914 [1] | (2) | (2) | 176 | (2) | (2) | (2) | (2) | (2) |
| Jan. 1, 1918 | (2) | (2) | 267 | (2) | (2) | (2) | 1,186,155 | (2) |
| Jan. 1, 1919 | (2) | (2) | 289 | (2) | (2) | (2) | 1,295,115 | (2) |
| Jan. 1, 1920 | 373 | (3) | 373 | 99 | 1,530,565 | (3) | 1,530,565 | 263,500 |
| Jan. 1, 1921 | 350 | 65 | 415 | 44 | 1,794,395 | 94,405 | 1,888,800 | 76,600 |
| Jan. 1, 1922 | 325 | 154 | 479 | 30 | 1,854,590 | 254,610 | 2,109,200 | 59,950 |
| Nov. 1, 1924 | 357 | 190 | 547 | 8 | 2,480,922 | 333,410 | 2,814,332 | 18,200 |
| Jan. 1, 1925 | 357 | 184 | 541 | 6 | 2,489,927 | 337,910 | 2,827,837 | 37,000 |
| May 1, 1925 | 365 | 185 | 550 | 4 | 2,511,817 | 342,025 | 2,853,842 | 11,000 |
| Jan. 1, 1926 | 352 | 158 | 510 | 2 | 2,562,357 | 290,610 | 2,852,967 | 5,500 |
| Jan. 1, 1927 | 327 | 138 | 465 | 7 | 2,834,282 | 226,725 | 3,061,007 | 61,000 |
| Jan. 1, 1928 | 326 | 97 | 423 | 5 | 3,036,125 | 214,255 | 3,250,380 | 22,000 |
| Jan. 1, 1929 | 341 | 72 | 413 | 14 | 3,325,890 | 183,650 | 3,509,540 | 99,000 |
| Jan. 1, 1930 | 358 | 54 | 412 | 8 | 3,634,825 | 130,760 | 3,765,585 | 37,200 |
| Jan. 1, 1931 | 346 | 89 | 435 | 10 | 3,706,610 | 236,075 | 3,942,685 | 45,000 |
| Jan. 1, 1932 | 365 | 108 | 473 | 6 | 3,624,992 | 389,616 | 4,014,608 | 8,720 |
| Jan. 1, 1933 | 372 | 133 | 505 | 18 | 3,445,118 | 444,392 | 3,889,510 | 31,545 |
| Jan. 1, 1934 | 454 | 137 | 591 | 13 | 3,553,569 | 364,648 | 3,918,217 | 44,450 |
| Jan. 1, 1935 | 435 | 196 | 631 | 7 | 3,614,749 | 443,751 | 4,058,500 | 13,900 |
| Jan. 1, 1936 | 422 | 210 | 632 | 15 | 3,749,835 | 367,212 | 4,117,047 | 46,899 |
| Jan. 1, 1937 | 423 | 149 | 572 | 11 | 3,966,616 | 328,265 | 4,294,881 | 81,200 |
| Jan. 1, 1938 [4] | 431 | 120 | 551 | 10 | 4,151,276 | 199,875 | 4,351,151 | 22,550 |
| Jan. 1, 1938 [5] | 431 | 120 | 551 | 10 | 3,970,196 | 380,955 | 4,351,151 | 283,020 |
| Jan. 1, 1939 | 435 | 103 | 538 | 7 | 3,933,785 | 574,770 | 4,508,555 | 142,250 |
| Jan. 1, 1940 | 461 | 86 | 547 | 10 | 4,196,694 | 431,952 | 4,628,646 | 92,567 |
| Jan. 1, 1941 | 420 | 136 | 556 | 6 | 4,180,588 | 538,381 | 4,718,969 | 141,225 |
| Jan. 1, 1942 | 430 | 92 | 522 | 1 | 4,496,843 | 459,756 | 4,956,599 | 43,400 |
| Jan. 1, 1943 | 386 | 85 | 471 | 1 | 4,409,013 | 492,998 | 4,902,011 | 195,100 |
| Jan. 1, 1944 | 384 | 68 | 452 | | 4,709,382 | 383,641 | 5,093,023 | 118,270 |
| Jan. 1, 1945 | 380 | 33 | 413 | 1 | 5,077,690 | 223,463 | 5,301,153 | 36,075 |
| Jan. 1, 1946 | 364 | 29 | 393 | 1 | 5,086,165 | 229,691 | 5,315,856 | 53,100 |
| Jan. 1, 1947 | 361 | 38 | 399 | | 5,336,399 | 233,083 | 5,569,482 | 162,200 |
| Jan. 1, 1948 | 352 | 38 | 390 | 2 | 5,825,566 | 208,686 | 6,034,252 | 367,250 |
| Jan. 1, 1949 | 336 | 39 | 375 | 3 | 6,230,505 | 208,490 | 6,438,995 | 341,500 |
| Jan. 1, 1950 | 320 | 47 | 367 | 2 | 6,222,998 | 473,302 | 6,696,300 | 145,600 |

[1] Bureau of the Census.
[2] Not available.
[3] Unoperative plants included under operative.
[4] On "old" basis, compares with previous years.
[5] On "new" basis, compares with succeeding years.

Source: Bureau of Mines, Information Circular 7578, August 1950.

Crude-oil capacity: The number of petroleum refineries in the United States decreased during 1949 from 375 to 367 while the total crude-oil charging capacity of refineries continued to increase. A gain in the through-put capacity of 257,305 barrels daily raised the total to a new high level 6,696,300 as of January 1, 1950. The capacity of the average refinery to process crude oil increased during 1949 from 17,171 barrels daily to 18,246. The four coastal refinery districts accounted for 178,900 barrels, or 70 percent of the total capacity increase, and the Illinois-Indiana-Kentucky district for 57,950 barrels, or 23 percent. Slight declines in capacity were reported in the Texas Inland and the Arkansas-Louisiana Inland districts.

The capacity building on January 1, 1950, 145,600 barrels daily, was less than half the amount under construction a year earlier. Most of the new construction involved enlargement of existing refineries and was confined to the east coast and Indiana-Illinois-Kentucky districts. Two new refineries, however, were under construction, one in Oklahoma and the other in Texas.

The shut-down capacity increased for the first time since 1946, and the 473,302 barrels daily reported on Jaunary 1, 1950, was the largest recorded since January 1, 1938. The only refining district showing a decline in the shut-down capacity was the Appalachian No. 2 district. The largest increases were reported in the Texas Gulf, Indiana-Illinois-Kentucky, California, and east coast districts.

The operating ratio of the petroleum refining industry, as indicated by dividing the January 1950 runs to stills of 5,483,000 barrels daily by the total installed capacity January 1, 1950, was 81.9 percent, compared with a ratio of 87.8 percent at the beginning of 1949.

TABLE F–7.—*Summary of refineries by States, Jan. 1, 1950*

[Barrels per day]

| State | Number | | | | Crude-oil through-put capacity | | | |
|---|---|---|---|---|---|---|---|---|
| | Operating | Shut-down | Total | Building | Operating | Shut-down | Total | Building |
| Alabama | 1 | 1 | 2 | | 3,000 | 5,000 | 8,000 | |
| Arkansas | 6 | | 6 | | 54,950 | 2,400 | 57,350 | |
| California | 49 | 8 | 57 | | 1,057,400 | 71,800 | 1,129,200 | |
| Colorado | 7 | | 7 | | 22,300 | | 22,300 | 1,500 |
| Delaware | 1 | | 1 | | 3,500 | | 3,500 | |
| Georgia | 1 | | 1 | | 5,500 | | 5,500 | |
| Idaho | 1 | | 1 | | 4,500 | | 4,500 | |
| Illinois | 14 | 5 | 19 | | 370,675 | 37,800 | 408,475 | |
| Indiana | 8 | 1 | 9 | | 341,800 | 11,000 | 352,800 | |
| Kansas | 16 | | 16 | | 201,350 | 200 | 201,550 | 10,000 |
| Kentucky | 7 | | 7 | | 79,100 | | 79,100 | |
| Louisiana | 12 | 3 | 15 | | 466,500 | 11,000 | 477,500 | |
| Maryland | 3 | | 3 | | 54,250 | 4,700 | 58,950 | 4,700 |
| Massachusetts | 1 | | 1 | | 24,000 | 14,000 | 38,000 | |
| Michigan | 16 | 1 | 17 | | 101,776 | 11,224 | 113,000 | 2,000 |
| Minnesota | 1 | 1 | 2 | | 5,000 | 3,000 | 8,000 | |
| Mississippi | 2 | | 2 | | 8,000 | | 8,000 | |
| Missouri | 1 | | 1 | | 37,800 | | 37,800 | |
| Montana | 8 | 6 | 14 | | 54,650 | 5,300 | 59,950 | |
| Nebraska | 3 | 2 | 5 | | 3,500 | 3,300 | 6,800 | |
| New Jersey | 6 | | 6 | | 359,000 | 18,000 | 377,000 | 70,000 |
| New Mexico | 8 | 1 | 9 | | 17,025 | 975 | 18,000 | |
| New York | 6 | | 6 | | 87,569 | 6,431 | 94,000 | |
| Ohio | 12 | | 12 | | 244,700 | 10,000 | 254,700 | 36,000 |
| Oklahoma | 20 | 3 | 23 | 1 | 252,500 | 33,850 | 286,350 | 4,700 |
| Oregon | 1 | | 1 | | 4,200 | | 4,200 | 2,000 |
| Pennsylvania | 17 | | 17 | | 476,750 | 24,000 | 500,750 | |
| Rhode Island | 3 | | 3 | | 13,000 | | 13,000 | |
| South Carolina | 1 | | 1 | | 6,500 | | 6,500 | |
| South Dakota | 2 | | 2 | | 275 | 25 | 300 | |
| Tennessee | 1 | 1 | 2 | | 4,000 | 750 | 4,750 | |
| Texas | 59 | 8 | 67 | 1 | 1,687,188 | 192,462 | 1,879,650 | 3,000 |
| Utah | 5 | | 5 | | 57,900 | | 57,900 | 1,200 |
| Washington | 1 | | 1 | | 5,500 | | 5,500 | |
| West Virginia | 3 | 1 | 4 | | 12,500 | 2,500 | 15,000 | |
| Wisconsin | 1 | | 1 | | 6,000 | | 6,000 | |
| Wyoming | 16 | 5 | 21 | | 88,840 | 3,585 | 92,425 | 10,500 |
| Total | 320 | 47 | 367 | 2 | 6,222,998 | 473,302 | 6,696,300 | 145,600 |

Source: Bureau of Mines Information Circular 7578, August 1950.

Cracked gasoline capacity: The daily average capacity of cracking facilities to produce cracked gasoline increased 6.1 percent during 1949 to a total of 1,820,683 barrels on January 1, 1950. There was a sharp decline in capacity under construction to a total on January 1, 1950, of 94,045 barrels, compared with 136,602 on January 1, 1949. Most of the building activity in progress in January 1950 was in the east coast, Indiana-Illinois, Kentucky, and Oklahoma-Kansas districts.

Principal gains in installed capacity during 1949 were in the Indiana-Illinois-Kentucky, Louisiana Gulf, and east coast districts.

Five districts reported declines, the largest being 10 percent in the Texas Gulf district.

On January 1, 1950, 95.1 percent of the total installed cracking capacity was operating, as compared with 95.5 percent January 1, 1949.

Catalytic-type cracking facilities accounted for 40 percent of the cracking capacity of refineries on January 1, 1950, compared to 5 percent on January 1, 1941. The daily capacity to produce cracked gasoline by the catalytic methods was 729,055 barrels on January 1, 1950. While the reformed type cracking units increased slightly in daily cracking capacity, the cracked gasoline producing capacity of the thermal cracking units decreased from 821,462 barrels daily on January 1, 1949, to 784,621 barrels on January 1, 1950, the lowest total in the past 10 years.

Capacity: The crude-oil capacity of a refinery represents the maximum daily average crude throughput of the plant in complete operation, with allowance for necessary shut-down time for routine maintenance, repairs, etc. It approximates the maximum daily average crude runs to stills that can be maintained for an extended period.

Cracked-gasoline capacity represents the amount of gasoline that can be produced on a daily average basis under maximum, sustained throughput of charging stocks of the types in current use.

TABLE F–8.—*Summary of cracking plants, by years, 1925–50*

| Date | Capacity [1] (barrels per day) | | | |
|---|---|---|---|---|
| | Operating | Shut-down | Total | Building |
| June 1, 1925 | 690,042 | 26,200 | 716,692 | 116,000 |
| June 1, 1926 | 844,800 | 47,690 | 892,490 | 47,600 |
| Jan. 1, 1928 | 1,013,000 | 253,000 | 1,266,000 | 22,000 |
| Jan. 1, 1929 | 1,194,501 | 147,923 | 1,342,424 | 134,450 |
| Jan. 1, 1930 | 1,419,200 | 139,840 | 1,559,040 | 149,900 |
| Jan. 1, 1931 | 1,594,990 | 244,661 | 1,839,651 | 111,130 |
| Jan. 1, 1932 | 1,603,809 | 394,585 | 1,998,394 | 48,587 |
| Jan. 1, 1933 | 1,580,051 | 417,694 | 1,997,745 | 33,650 |
| Jan. 1, 1934 | 1,712,629 | 377,735 | 2,090,364 | 59,300 |
| Jan. 1, 1935 | 1,897,778 | 311,491 | 2,209,269 | 20,000 |
| Jan. 1, 1936 | 1,994,868 | 215,450 | 2,210,318 | 30,450 |
| Jan. 1, 1937 | 2,077,325 | 139,525 | 2,216,850 | 138,220 |
| Jan. 1, 1938 [1] | 853,161 | 79,810 | 932,971 | 86,060 |
| Jan. 1, 1939 | 877,347 | 119,152 | 996,499 | 47,180 |
| Jan. 1, 1940 | 964,665 | 81,545 | 1,046,214 | 58,075 |
| Jan. 1, 1941 | 1,021,006 | 82,042 | 1,103,048 | 48,145 |
| Jan. 1, 1942 | 1,144,594 | 49,105 | 1,193,699 | 28,985 |
| Jan. 1, 1943 | 1,117,533 | 71,810 | 1,189,343 | 155,984 |
| Jan. 1, 1944 | 1,236,343 | 50,102 | 1,286,445 | 189,244 |
| Jan. 1, 1945 | 1,439,226 | 48,688 | 1,487,914 | 14,100 |
| Jan. 1, 1946 | 1,386,162 | 113,613 | 1,499,775 | 57,870 |
| Jan. 1, 1947 | 1,412,814 | 101,808 | 1,514,622 | 80,000 |
| Jan. 1, 1948 | 1,556,958 | 67,200 | 1,624,158 | 172,200 |
| Jan. 1, 1949 | 1,638,783 | 76,490 | 1,715,273 | 136,602 |
| Jan. 1, 1950 | 1,732,241 | 88,442 | 1,820,683 | 94,045 |

[1] Beginning Jan. 1, 1938, capacity is expressed in terms of cracked gasoline production.

TABLE F–9.—*Summary of capacity of cracking plants, by States, Jan. 1, 1950 (to produce cracked gasoline)*

[Barrels per day]

| State | Operating | Shut-down | Total | Building |
|---|---|---|---|---|
| Alabama | | | | |
| Arkansas | 7,500 | | 7,500 | 1,400 |
| California | 188,150 | 14,200 | 202,350 | 2,500 |
| Colorado | 5,725 | 800 | 6,525 | |
| Delaware | | | | |
| Georgia | | | | |
| Idaho | 600 | | 600 | |
| Illinois | 120,530 | 10,600 | 131,130 | 12,700 |
| Indiana | 109,800 | | 109,800 | |
| Kansas | 64,250 | 800 | 65,050 | 8,500 |
| Kentucky | 23,350 | | 23,350 | 800 |
| Louisiana | 118,652 | 200 | 118,852 | |
| Maryland | 14,260 | | 14,260 | |
| Massachusetts | 5,053 | 2,947 | 8,000 | |
| Michigan | 34,549 | | 34,549 | 6,600 |
| Minnesota | | | | |
| Mississippi | 1,700 | | 1,700 | |
| Missouri | 15,500 | | 15,500 | |
| Montana | 14,780 | | 14,780 | |
| Nebraska | 360 | | 360 | |
| New Jersey | 94,650 | 8,100 | 102,750 | 35,000 |
| New Mexico | 3,270 | | 3,270 | |
| New York | 19,200 | | 19,200 | |
| Ohio | 107,790 | 4,340 | 112,130 | 6,600 |
| Oklahoma | 88,760 | 15,825 | 104,585 | 8,830 |
| Oregon | | | | |
| Pennsylvania | 153,814 | 8,000 | 161,814 | |
| Rhode Island | 700 | | 700 | |
| South Carolina | | | | |
| South Dakota | | | | |
| Tennessee | 700 | | 700 | |
| Texas | 496,310 | 20,850 | 517,160 | 3,315 |
| Utah | 8,998 | | 8,998 | |
| Washington | 1,000 | | 1,000 | |
| West Virginia | 3,450 | 1,200 | 4,650 | |
| Wisconsin | | | | |
| Wyoming | 28,840 | 580 | 29,420 | 7,800 |
| Total | 1,732,241 | 88,442 | 1,820,683 | 94,045 |

Source: Bureau of Mines, Information Circular 7578.

TABLE F–10.—*Summary of cracking plants, by types, 1941–50*

[Barrels per day]

| Date | Reformed | Thermal | Catalytic | Total |
|---|---|---|---|---|
| Jan. 1, 1941 | 187,560 | 859,068 | 56,420 | 1,103,048 |
| Jan. 1, 1942 | 225,400 | 902,659 | 65,640 | 1,193,699 |
| Jan. 1, 1943 | 275,580 | 829,861 | 83,902 | 1,189,343 |
| Jan. 1, 1944 | 281,936 | 811,615 | 192,894 | 1,286,445 |
| Jan. 1, 1946 | 274,925 | 836,094 | 388,756 | 1,499,775 |
| Jan. 1, 1947 | 283,515 | 807,729 | 423,378 | 1,514,622 |
| Jan. 1, 1948 | 275,505 | 842,828 | 505,825 | 1,624,158 |
| Jan. 1, 1949 | 290,275 | 821,462 | 603,536 | 1,715,273 |
| Jan. 1, 1950 | 307,007 | [1] 784,621 | 729,055 | 1,820,683 |

[1] Includes some reformed and catalytic.

Source: Bureau of Mines Information Circular 7578.

## *Natural gas*

*Wells.*—Almost two-thirds of natural-gas production in 1948 came out of wells producing gas and no oil, but it came out of only 64,212 gas wells, while there were over 400,000 producing oil wells. The gas output of each oil well is much smaller than that of gas wells.

Over one-half of the gas wells are located in the old fields of the Appalachian area in Pennsylvania and West Virginia. While the

TABLE F–11.—*Number of producing gas wells, by State, 1934–47*

| State | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| United States | 54,130 | 53,790 | 54,500 | 55,370 | 53,770 | 53,530 | 53,880 | 55,500 | 56,150 | 57,200 | 58,780 | 60,660 | 62,740 | 63,670 | 64,212 |
| Arkansas | 170 | 180 | 180 | 190 | 190 | 190 | 190 | 200 | 200 | 190 | 180 | 180 | 180 | 160 | 165 |
| California | 30 | 30 | 40 | 60 | 70 | 80 | 90 | 110 | 130 | 170 | 200 | 250 | 310 | 350 | 365 |
| Colorado | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 30 |
| Illinois | 90 | 80 | 70 | 70 | 80 | 80 | 90 | 90 | 80 | 80 | 80 | 80 | 90 | 100 | 100 |
| Indiana | 1,010 | 970 | 960 | 970 | 1,010 | 960 | 970 | 950 | 940 | 950 | 810 | 820 | 840 | 830 | 800 |
| Kansas | 2,950 | 2,700 | 2,630 | 2,500 | 2,290 | 2,140 | 2,100 | 2,090 | 1,950 | 1,990 | 2,040 | 2,220 | 2,400 | 2,700 | 3,000 |
| Kentucky and Tennessee | 2,350 | 2,340 | 2,380 | 2,510 | 2,340 | 2,340 | 2,400 | 2,570 | 2,650 | 2,850 | 3,090 | 3,250 | 3,390 | 3,350 | 3,498 |
| Louisiana | 1,360 | 1,370 | 1,490 | 1,600 | 1,560 | 1,520 | 1,530 | 1,640 | 1,730 | 1,790 | 1,820 | 1,900 | 2,000 | 2,100 | 2,210 |
| Michigan | 110 | 170 | 290 | 350 | 260 | 310 | 350 | 450 | 520 | 560 | 630 | 640 | 750 | 760 | 700 |
| Mississippi | 110 | 110 | 110 | 90 | 60 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 30 | 60 | 75 |
| Missouri | 160 | 140 | 130 | 150 | 120 | 110 | 120 | 130 | 120 | 110 | 110 | 110 | 110 | 100 | 100 |
| Montana | 340 | 350 | 360 | 380 | 350 | 370 | 410 | 450 | 460 | 500 | 580 | 620 | 650 | 700 | 760 |
| New Mexico | 30 | 30 | 50 | 70 | 70 | 90 | 100 | 110 | 120 | 120 | 130 | 150 | 170 | 220 | 230 |
| New York | 2,030 | 2,030 | 2,040 | 2,090 | 2,000 | 2,040 | 2,030 | 2,030 | 2,000 | 2,000 | 1,990 | 1,850 | 1,830 | 1,700 | 1,600 |
| Ohio | 6,570 | 6,400 | 6,350 | 6,340 | 6,200 | 6,270 | 6,300 | 6,700 | 6,750 | 6,900 | 6,950 | 7,000 | 7,200 | 7,190 | 7,000 |
| Oklahoma | 2,710 | 2,640 | 2,610 | 2,630 | 2,480 | 2,420 | 2,430 | 2,400 | 2,250 | 2,330 | 2,450 | 2,680 | 3,000 | 3,250 | 3,400 |
| Pennsylvania | 19,410 | 19,270 | 19,150 | 19,130 | 18,540 | 18,100 | 18,130 | 18,300 | 18,500 | 18,600 | 19,000 | 19,300 | 19,500 | 19,100 | 18,800 |
| Texas | 1,900 | 2,000 | 2,720 | 3,260 | 3,160 | 3,120 | 3,150 | 3,400 | 3,460 | 3,560 | 3,800 | 4,400 | 4,800 | 5,000 | 5,100 |
| West Virginia | 12,660 | 12,820 | 12,770 | 12,800 | 12,840 | 13,200 | 13,300 | 13,700 | 14,100 | 14,310 | 14,720 | 15,000 | 15,300 | 15,800 | 16,100 |
| Wyoming | 100 | 110 | 120 | 130 | 100 | 110 | 110 | 110 | 120 | 120 | 130 | 140 | 140 | 150 | 145 |
| Other States | 20 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 34 |

NOTE.—Data pertains only to dry gas and condensate wells. Data as of Dec. 31.

Source: U. S. Bureau of Mines.

number of wells in Pennsylvania has shown little change, that in West Virginia has risen steadily. Both of these States and Ohio have used their depleted wells for underground storage of natural gas. Other States which have shown steady gains in the number of gas wells are California, Louisiana, Montana, New Mexico, Texas, and Wyoming. Indiana, Missouri, and New York have declined most sharply.

Gas pipeline mileage in 1949 totaled 364,000 miles of varying diameter. The trend is definitely toward large-diameter interstate trunk pipelines, particularly for natural gas transmission over long distances. Over three-fourths of the mileage is employed to carry natural gas. The manufactured gas pipeline mileage has actually declined, as has that of mixed gas.

TABLE F–12.—*Miles of utility gas main, by type of gas, 1932–49*

[Thousands]

| Year | Total | Type of gas | | | |
|---|---|---|---|---|---|
| | | Natural | Manufactured | Mixed | Liquefied petroleum |
| 1932 | 254.8 | 154.6 | 85.1 | 15.1 | ---- |
| 1933 | 261.0 | 160.1 | 85.1 | 15.8 | ---- |
| 1934 | 262.0 | 162.7 | 83.5 | 15.8 | ---- |
| 1935 | 265.2 | 165.6 | 83.2 | 16.4 | ---- |
| 1936 | 270.4 | 173.6 | 79.9 | 16.9 | ---- |
| 1937 | 274.6 | 177.1 | 80.6 | 16.9 | ---- |
| 1938 | 277.9 | 181.8 | 79.2 | 16.9 | ---- |
| 1939 | 281.7 | 184.4 | 80.0 | 17.3 | ---- |
| 1940 | 286.8 | 189.0 | 79.8 | 18.0 | ---- |
| 1941 | 292.0 | 192.6 | 81.1 | 18.3 | ---- |
| 1942 | 296.2 | 196.5 | 81.0 | 18.7 | ---- |
| 1943 | 299.7 | 203.2 | 77.6 | 18.9 | ---- |
| 1944 | 307.5 | 212.4 | 75.9 | 19.2 | ---- |
| 1945 | 310.8 | 218.1 | 72.0 | 18.7 | 2.0 |
| 1946 | 318.9 | 226.5 | 71.1 | 18.5 | 2.8 |
| 1947 | 331.4 | 242.9 | 68.0 | 15.8 | 4.7 |
| 1948 | 346.4 | 259.4 | 67.0 | 14.2 | 5.8 |
| 1949 | 364.1 | 281.5 | 64.3 | 12.0 | 6.3 |

NOTE.—Includes field, gathering, transmission, and distribution but excludes service pipe. Data are not adjusted to a common diameter equivalent. Liquefied petroleum gas-miles of main are included with manufactured gas prior to 1945.

Source: American Gas Association, Gas Facts 1949.

## 4. MAJOR CONCERNS IN THE INDUSTRY

### *Bituminous and lignite coal*

Out of the five largest bituminous-coal producers, two are so-called captive mining operations, owned by concerns in other industries to supply their coal needs. Out of the 18 largest, 5 are captive: 4 of them attached to steel firms and 1 to a railroad. The largest concern, Pittsburgh Consolidation Coal Co., produced 5 percent of the total coal mined in 1949. In an industry with ownership as widely scattered as in bituminous coal, that is a relatively large share to be produced by a single concern. Together, the 18 largest firms produced more than one-quarter of the 1949 total bituminous coal output.

The four steel companies which belong to the largest coal mine group, are also the largest steel concerns.

## TABLE G–1.—*Bituminous and lignite—1949*

CLASS 1—PRODUCTION OF 3,000,000 TONS AND OVER

| | | |
|---|---|---|
| 1. Pittsburgh Coal Co. of Pennsylvania (Pennsylvania) (536,612 strip) | 5,816,485 | |
| Consolidation Coal Co.: | | |
| (West Virginia) | 4,651,589 | |
| (Kentucky) (85,774 strip) | 1,534,955 | |
| Christopher Coal Co. (West Virginia) | 3,512,673 | |
| Hanna Coal Co. (Ohio) (2,869,045 strip) | 4,326,641 | |
| Cadiz Mining Co. (Ohio) (538,717 strip) | 538,717 | |
| Jefferson Coal Co. (Ohio) (201,605 strip) | 1,043,155 | |
| | | 21,424,215 |
| 2. United States Coal & Coke Co.: | | |
| (Kentucky) | 1,439,466 | |
| (West Virginia) | 4,103,061 | |
| H. C. Frick Coke Co. (Pennsylvania) | 9,607,860 | |
| Tennessee Coal, Iron & Railroad Co. (Alabama) | 2,739,597 | |
| Geneva Steel Co. (Captive—United States Steel Corp.) (Utah) | 1,360,592 | |
| | | 19,250,576 |
| 3. Peabody Coal Co. (Illinois) | 8,035,084 | |
| Black Mountain Corp. (Kentucky) | 538,306 | |
| American Eagle Colliery (West Virginia) | 244,460 | |
| | | 8,817,850 |
| 4. Eastern Gas & Fuel Associates, Coal Division: | | |
| (Kentucky) | 213,864 | |
| (Pennsylvania) | 680,215 | |
| (West Virginia) | 7,649,661 | |
| | | 8,543,740 |
| 5. Bethlehem Collieries Corp.: | | |
| (Pennsylvania) | 2,558,903 | |
| (West Virginia) | 2,684,387 | |
| Minds Coal Mining Corp. (West Virginia) | 516,324 | |
| Red Lands Coal Co. (Pennsylvania)[1] | 158,435 | |
| Heisley Coal Co. (Pennsylvania)[2] | 619,515 | |
| Monroe Coal Mining Co. (Pennsylvania) | 548,909 | |
| Dawson Coal Co. (Captive—Bethlehem Steel Corp.) (West Virginia)[1] | 485,677 | |
| | | 7,572,150 |
| 6. Island Creek Coal Co. (West Virginia) | 4,885,827 | |
| Marianna Smokeless Coal Co. (West Virginia) | 272,372 | |
| Pond Creek Pocahontas Co.: | | |
| (West Virginia) | 1,216,353 | |
| (Kentucky) | 289,619 | |
| | | 6,664,171 |
| 7. Bevier Coal Co. (Missouri) (strip) | 789,674 | |
| Broken Aro Coal Co. (Oklahoma) (strip) | 439,371 | |
| Eagle-Cherokee Coal Mining Co. (Kansas) (strip) | 126,157 | |
| Homestead Coal Co. (Kentucky) (strip) | 1,864,814 | |
| Hume-Sinclair Coal Mining Co. (Missouri) (strip) | 1,020,286 | |
| Huntsville-Sinclair Mining Co. (Missouri) (strip) | 426,283 | |
| Key Coal Co. (Illinois) | 255,077 | |
| Marigold Coal Mining Co. (Alabama) (strip) | 100,129 | |
| Old Mac Coal Co. (Oklahoma) (strip) (closed 1949) | 76,069 | |
| Pershing Coal Co. (Iowa) (strip) (new 1949) | 129,638 | |
| Sooner Coal Mining Co. (Oklahoma) (strip) (closed 1949) | 113,214 | |
| W. A. Wickliffe Coal Co. (Kentucky) | 239,501 | |
| | | 5,580,213 |
| 8. The Pittston Co.: | | |
| Clinchfield Coal Corp.: | | |
| (Virginia) (321,725 strip) | 2,528,191 | |
| (West Virginia) (292,908 strip) | 460,856 | |
| Davis Coal & Coke Co. (Maryland): | | |
| (West Virginia) (2,280 strip) | 276,337 | |
| Lillybrook Coal Co. (West Virginia) | 1,063,824 | |
| Amigo Smokeless Coal Co. (West Virginia) | 302,689 | |
| Sheridan-Wyoming Coal Co.: | | |
| (Wyoming) | 757,667 | |
| (Montana) (acquired 1949) | 49,506 | |
| | | 5,439,070 |
| 9. Truax-Traer Coal Co.: | | |
| (Illinois) (1,190,094 strip) | 1,584,640 | |
| (North Dakota) (strip) | 1,564,447 | |
| (West Virginia) (55,983 strip) | 2,113,388 | |
| | | 5,262,475 |
| 10. Old Ben Coal Corp. (Illinois) | 3,672,112 | |
| Raleigh Wyoming Mining Co. (West Virginia) | 902,496 | |
| Coal Processing Corp. (Virginia) | 150,218 | |
| Elkhorn Coal Co. (Kentucky) | 125,756 | |
| | | 4,850,582 |
| 11. Berwind-White Coal Mining Co. (Pennsylvania) | 1,652,213 | |
| New River and Pocahontas Consolidated Coal Co. (West Virginia) | 2,462,444 | |
| Kentland-Elkhorn Coal Co. (Kentucky) | 430,218 | |
| | | 4,544,875 |
| 12. West Kentucky Coal Co. (Kentucky) (1,743,965 strip) | 4,345,001 | |
| 13. Rochester & Pittsburgh Coal Co: | | |
| (Pennsylvania) (349,440 strip) | 3,805,495 | |
| (West Virginia) | 453,082 | |
| | | 4,258,577 |

[1] Sold Oct. 31, 1949.
[2] Merged into Monroe Coal Mining Co., Dec. 12, 1949.

TABLE G–1.—*Bituminous and lignite—1949*—Continued

CLASS 1—PRODUCTION OF 3,000,000 TONS AND OVER—Continued

| | | |
|---|---|---|
| 14. Republic Steel Corp.: | | |
| (Alabama) | 737, 559 | |
| (Pennsylvania) | 2, 832, 083 | |
| (Kentucky) | 306, 339 | |
| (West Virginia) (captive) | 176, 441 | |
| | | 4, 052, 422 |
| 15. Pocahontas Fuel Co., Inc. (Virginia and West Virginia) | 2, 326, 312 | |
| Pocahontas Coal Corp. (Virginia and West Virginia) | 1, 594, 187 | |
| | | 3, 920, 499 |
| 16. Jones & Laughlin Steel Corp. (Pennsylvania) | 3, 330, 790 | |
| Jones & Laughlin Steel Corp. (captive) (West Virginia) | 375, 507 | |
| | | 3, 706, 297 |
| 17. Union Pacific Coal Co. (captive, Union Pacific R. R. Co.) (Wyoming) | 3, 400, 992 | |
| 18. Northern Illinois Coal Corp. (Illinois) (strip) | 967, 202 | |
| Tecumseh Coal Corp. (Indiana) (strip) | 624, 136 | |
| Sunlight Coal Co. (Indiana) (strip) | 1, 265, 160 | |
| Northwestern Illinois Coal Corp. (Illinois) (strip) | 38, 401 | |
| Seminole Coal Corp. (Illinois) (strip) | 444, 142 | |
| | | 3, 339, 041 |

Source: Keystone Coal Buyers Manual, 1949.

*Anthracite*

Production of anthracite, judging by the share of the production contributed by the largest concerns in the industry, is more highly concentrated than that of bituminous. The largest anthracite operator, Glen Alden Coal Co., in 1949, produced 15 percent of total anthracite output of 42.7 million tons. The nine largest anthracite firms together produced almost two-thirds of all anthracite.

TABLE G–2.—*Largest producers—Pennsylvania anthracite*

| | 1949 tonnage |
|---|---|
| 1. Glen Alden Coal Co | 6, 475, 010 |
| 2. Philadelphia & Reading Coal & Iron Co. (¼ strip mining) | 5, 027, 932 |
| 3. Hudson Coal Co. (¼ strip) | 3, 640, 596 |
| 4. Lehigh Navigation Coal Co., Inc. (¼ strip) | 3, 362, 952 |
| 5. Lehigh Valley Coal Co | 2, 457, 541 |
| 6. Susquehanna collieries division, The M. A. Hanna Co. (¼ strip) | 1, 954, 902 |
| 7. Stevens Coal Co. (part strip) | 1, 815, 890 |
| 8. Hazle Brook Coal Co. (part strip): | |
| Jeddo-Highland Coal Co. (part strip) | |
| Raven Run Coal Co. (part strip) | 1, 547, 024 |
| 9. Moffat Coal Co | 1, 503, 859 |

Source: Keystone Coal Buyers Manual, 1949.

TABLE G–3.—*The top 10 coal-producing organizations*

[Production in millions of tons]

| Group | 1949 | 1947 | 1944 | 1941 |
|---|---|---|---|---|
| 1. Pittsburgh Consolidation | [1] 21.4 | [1] 27.2 | 10.9 | 9.3 |
| 2. United States Steel | 19.2 | 31.9 | 31.7 | 28.7 |
| 3. Peabody | 8.8 | 12.4 | 15.9 | 11.4 |
| 4. Eastern Gas & Fuel | 8.5 | 12.7 | 13.4 | 12.8 |
| 5. Bethlehem Steel | 7.5 | 7.6 | 8.1 | 7.7 |
| 6. Island Creek | 6.6 | 9.1 | 10.2 | 9.6 |
| 7. Glen Alden | 6.4 | 8.2 | 8.3 | 8.6 |
| 8. Sinclair | 5.5 | (2) | (2) | (2) |
| 9. Pittston | 5.4 | (2) | (2) | (2) |
| 10. Truax-Traer | 5.2 | (2) | (2) | (2) |
| Pittsburgh | (1) | (1) | 10.5 | 9.7 |
| Philadelphia & Reading | (2) | 7.6 | (2) | (2) |
| Old Ben | (2) | 7.1 | (2) | (2) |
| Pocahontas | (2) | 7.0 | 7.6 | 6.7 |
| Berwind | (2) | (2) | 7.2 | 7.7 |
| Total this group | 94.3 | 130.8 | 123.8 | 112.2 |
| Percentage of total | 19.7 | 19.2 | 18.2 | 20.1 |

[1] Merger.
[2] Not in first 10.

Source: Keystone Coal Buyers Manual.

TABLE G–4.—*Bituminous coal production by size of companies* [1]

| | Production of leading companies | | | | | Total production |
|---|---|---|---|---|---|---|
| | The largest | Top 10 | Top 25 | Top 50 | Top 100 | |
| 1941 | 28,672,836 | 109,879,645 | 171,938,495 | 236,624,344 | 307,540,052 | 514,149,245 |
| 1942 | 31,091,483 | 122,051,514 | 194,067,254 | 286,432,482 | 348,831,508 | 582,692,937 |
| 1943 | 29,524,356 | 120,056,948 | 192,379,768 | 266,519,412 | 347,253,073 | 590,177,069 |
| 1944 | 31,760,773 | 123,279,086 | 198,185,571 | 277,902,542 | 360,797,212 | 619,576,240 |
| 1945 | 26,852,501 | 120,615,142 | 183,894,931 | 254,680,178 | 328,690,795 | 577,617,327 |
| 1946 | 24,463,000 | 108,154,797 | 166,963,806 | 230,346,662 | 297,109,965 | 533,922,068 |
| 1947 | 31,901,494 | 128,357,308 | 198,455,393 | 263,377,520 | 335,398,644 | 630,623,722 |
| 1948 | 27,351,622 | 123,872,747 | 191,423,843 | 256,587,797 | 324,130,803 | 599,518,229 |
| 1949 | 21,424,215 | 93,405,042 | 144,171,568 | 191,679,679 | 240,628,824 | 437,868,036 |
| | Percent of total | | | | | |
| 1941 | 5.6 | 21.4 | 33.4 | 46.0 | 59.8 | 100 |
| 1942 | 5.3 | 20.9 | 33.3 | 49.2 | 59.9 | 100 |
| 1943 | 5.0 | 20.3 | 32.6 | 45.2 | 58.8 | 100 |
| 1944 | 5.1 | 19.9 | 32.0 | 44.9 | 58.2 | 100 |
| 1945 | 5.0 | 20.9 | 31.8 | 44.1 | 56.9 | 100 |
| 1946 | 4.6 | 20.3 | 31.3 | 43.1 | 55.6 | 100 |
| 1947 | 5.1 | 20.4 | 31.5 | 41.8 | 53.2 | 100 |
| 1948 | 4.6 | 20.7 | 31.9 | 42.8 | 54.1 | 100 |
| 1949 | 4.9 | 21.3 | 32.9 | 43.8 | 55.2 | 100 |

[1] In some cases a company is in fact a group of affiliated companies.

Source: Keystone Coal Buyers Manual.

## *Oil*

In 1911, the Government in an antitrust suit dissolved the Standard Oil Trust, which at that time was the dominant power in the oil industry. Since those days the oil industry has many times multiplied in size. Similarly, the concerns which then operated in the industry, and some of those who have entered it since that time, have grown tremendously. It is no longer possible to speak of the oil industry in any sense as a one-company domain. But a group of about 20 companies (including 6 former members of the Standard Oil Trust) individually, and sometimes in cooperation, do a major share of the business in most phases of the industry.

The major companies' share is least in the number of producing oil wells. The great difference in their percentage ownership of wells and their share of crude oil production, however, indicates that they own the more productive wells. During the last decade a trend has appeared for sale of small stripper wells by large concerns back to the landowner (or to some other interested local party), who operates the well often as a side line. The so-called majors' share of industry activity is greatest where large investment and advanced research are involved: in catalytic cracking, which they pioneered, and in the other complex refining processes. For this reason, while the majors' runs to stills have increased, they exceed their gasoline output, which has declined. The difference goes into the processing of the more highly refined, more expensive products.

TABLE G–5.—*Position of major oil companies in the industry*

| | Number of companies | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|---|
| Number of producing oil wells (Dec. 31) | 21 | *Percent* 27.6 | *Percent* 28.0 | *Percent* 28.6 | *Percent* 28.3 | *Percent* 28.7 | *Percent* 29.4 | *Percent* |
| Annual gross production of crude oil | 21 | 52.2 | 54.2 | 53.8 | 55.2 | 58.8 | 61.3 | |
| Stocks of crude oil (Dec. 31) | 19 | 75.7 | 78.1 | 77.3 | 81.8 | 79.8 | 78.9 | |
| Annual crude runs to stills | 19 | 80.9 | 81.3 | 81.5 | 80.4 | 82.8 | 83.2 | |
| Annual motor fuel manufactures | 19 | 72.6 | 74.4 | 71.6 | 68.6 | 66.8 | 64.6 | |
| Stocks of motor fuel (Dec. 31) | 19 | 80.4 | 77.9 | 82.0 | 73.6 | 65.7 | 56.8 | |
| Aviation gasoline manufactured | 17 | 56.9 | 43.5 | 65.4 | 65.0 | 69.6 | 73.8 | |
| Crude oil refining capacity (Jan. 1) | 21 | | 75.8 | | | | | 82.0 |
| Cracking capacity (Jan. 1) | 21 | | 84.1 | | | | | 85.8 |
| Catalytic cracking capacity (Jan.1) | 18 | | 100.0 | | | | | 88.2 |
| Alkylation capacity (Nov. 1) | 18 | | | | | | 82.0 | |
| Butane isomerization capacity (Nov. 1) | 12 | | | | | | 81.9 | |
| Aviation gasoline capacity (March) | 21 | | | | | | | 88.8 |

The above information was obtained largely in reply to questionnaires sent to 22 major oil companies. 20 of these companies answered. These are the 20 companies which answered: Cities Service, Pure, Tide Water, Socony, Richfield, Standard (New Jersey), Humble (a subsidiary of Standard Oil of New Jersey), Skelly, Mid-Continent, Shell, Sun, Gulf, Phillips, Continental, Standard (Ohio), Union, Atlantic, Texas, Standard (Indiana), Sinclair. The two which did not answer, for whom data were obtained from other sources, were: Ohio Oil Co. and Standard (California).

Source: Hearings of the Special Committee Investigating Petroleum Resources, U. S. Senate, 79th Cong., 2d sess., The Independent Petroleum Company, p. 52. Material prepared by Department of Justice, Antitrust Division.

TABLE G–6.—*Acreage held in lease and fee in United States (net) by 33 leading oil companies, 1947* [1]

| | |
|---|---|
| Standard Oil Co. (New Jersey) | 21,487,900 |
| Gulf Oil Corp | 11,023,385 |
| Socony-Vacuum Oil Co., Inc | 10,158,973 |
| The Texas Co | 9,815,949 |
| Standard Oil Co. (Indiana) | 8,191,701 |
| Sun Oil Co | 7,973,945 |
| Sinclair Oil Co | 5,945,953 |
| Phillips Petroleum Co | 4,435,303 |
| Standard Oil Co. of California | 4,091,019 |
| Atlantic Refining Co | 3,820,000 |
| Cities Service Co | 3,598,000 |
| Shell Union Oil Corp | 3,099,855 |
| Tidewater-Associated Oil Co | 2,548,652 |
| Pure Oil Co | 2,283,886 |
| Ohio Oil Co | 2,262,798 |
| Skelly Oil Co | 2,124,394 |
| Continental Oil Co | 2,009,441 |
| Amerada Petroleum Corp | 1,724,000 |
| American Republics Corp | 1,684,956 |
| Union Oil Co. of California | 1,270,045 |
| Standard Oil Co. (Ohio) | 1,250,384 |
| Mid-Continent Petroleum Corp | 957,674 |
| Louisiana Land & Exploration Co | 926,329 |
| Houston Oil Co. of Texas | 843,000 |
| Barnsdall Oil Co | 731,410 |
| Texas Pacific Coal & Oil Co | 610,030 |
| Lion Oil Co | 591,876 |
| Plymouth Oil Co | 349,129 |
| Argo Oil Corp | 183,852 |
| Wilcox Oil Co | 83,222 |
| Sunray Oil Corp | 76,686 |
| Derby Oil Co | 62,646 |
| Bishop Oil Co | 19,426 |
| Total | [2] 116,235,819 |

[1] Acreage shown includes acreage held by subsidiaries of above-named companies.
[2] 62.5 percent of all acreage.

Source: The Petroleum Data Book.

That the major integrated oil firms are serious participants in the ownership and operation of pipelines, both trunk, and gathering, appears from the statistics of the Interstate Commerce Commission. The data do not on their face reveal that an overwhelming proportion of these pipelines, even when they do not carry the name of the owning firm, are jointly owned by a number of the major oil companies. The Great Lakes Pipeline Co., for instance, a long established refined products line, has eight owners, all among the largest oil concerns. The listed companies and mileages include only those which, because their operations are of interstate character, report to the Interstate Commerce Commission.

*Natural gas*

Tax receipts by the State of Texas indicate that the major integrated oil firms also are major producers of gas (both from gas and oil wells) in that important producing State. Most of that part of the gas which they do not use either in their field or refinery operations they sell to the large interstate trunk lines.

STATISTICS OF OIL PIPELINE COMPANIES FOR THE YEAR ENDED DEC. 31, 1948

TABLE G–7.—*Pipeline mileage operated at close of year, by individual companies*

| Name of company | Grand total | Trunk line | | | Gathering line, crude oil |
|---|---|---|---|---|---|
| | | Total | Crude oil | Refined oils | |
| Total mileage operated | 124,092 | 77,056 | 63,364 | 13,692 | 47,036 |
| Ajax Pipe Line Corp | 819 | 819 | 819 | | |
| American Petroleum Co | 127 | 74 | 74 | | 53 |
| Anderson-Prichard Pipe Line Corp | 104 | | | | 104 |
| Arkana Transit Corp | 68 | 35 | 35 | | 33 |
| Arkansas Pipeline Corp | 496 | 279 | 279 | | 217 |
| Atlantic Pipe Line Co | [1] 1,838 | [1] 1,311 | [1] 1,307 | 4 | 527 |
| Atlas Oil & Refining Corp | 85 | 38 | 35 | 3 | 47 |
| Bell General Pipe Line Co | 168 | 40 | 40 | | 128 |
| Bell Oil & Gas Co | 128 | 10 | | 10 | 118 |
| Bell-Western Corp | 51 | 35 | 35 | | 16 |
| Bradford Transit Co | 699 | | | | 699 |
| Buckeye Pipe Line Co | 5,746 | 2,653 | 2,544 | 109 | 3,093 |
| Buffalo Pipe Line Corp | 161 | 161 | | 161 | |
| Canadian Trunk Line | 10 | 10 | 10 | | |
| Claiborne Pipeline Co | 33 | 33 | | 33 | |
| Cleveland Pipe Line Co | 20 | 20 | 20 | | |
| Continental Pipe Line Co | 1,831 | | | | [2] 1,831 |
| Cooperative Refinery Ass'n | 986 | 274 | 273 | 1 | 712 |
| Crown Central Pipe Line & Transportation Corp | 1 | 1 | | 1 | |
| Detroit Southern Pipe Line Co | 85 | 85 | | 85 | |
| Empire Pipeline Co | 778 | 312 | 312 | | 466 |
| Eureka Pipe Line Co | 3,892 | 502 | 502 | | 3,390 |
| Freedom-Valvoline Oil Co | 1,471 | 297 | 297 | | 1,174 |
| Globe Pipe Line Co | 11 | 11 | 8 | 3 | |
| Great Lakes Pipe Line Co | 3,129 | 3,129 | | 3,129 | |
| Gulf Refining Co | 9,488 | 6,779 | 6,456 | 323 | 2,709 |
| Humble Pipe Line Co | 8,840 | 5,757 | 5,481 | 276 | 3,083 |

See footnotes at end of table, p. 135.

STATISTICS OF OIL PIPELINE COMPANIES FOR THE YEAR ENDED DEC. 31, 1948—Continued

TABLE G–7.—*Pipeline mileage operated at close of year, by individual companies*—Continued

| Name of company | Grand total | Trunk line | | | Gathering line, crude oil |
|---|---|---|---|---|---|
| | | Total | Crude oil | Refined oils | |
| Illinois Pipe Line Co. of Texas | 106 | | | | 106 |
| Interstate Oil Pipe Line Co | 4,571 | 3,163 | 3,163 | | 1,408 |
| Kaw Pipe Line Co | 1,125 | | | | 1,125 |
| Keystone Pipe Line Co | 699 | 699 | 3 | 696 | |
| Magnolia Pipe Line Co | 8,670 | 6,071 | 5,596 | 475 | [2] 2,599 |
| National Transit Co | 3,037 | 1,148 | 1,138 | 10 | 1,889 |
| New York Transit Co., Inc | 184 | 184 | 184 | | |
| Northern Pipe Line Co | 624 | 624 | 624 | | |
| Ohio Oil Co | 3,908 | 2,522 | 2,522 | | 1,386 |
| Ohio River Pipe Line Co | 2 | 2 | 2 | | |
| Pan American Pipe Line Co | 875 | 436 | 436 | | 439 |
| Phillips Petroleum Co | 1,616 | 1,616 | | [4] 1,616 | |
| Phillips Pipe Line Co | 1,953 | 1,029 | 1,021 | 8 | 924 |
| Plantation Pipe Line Co | 1,261 | 1,261 | | 1,261 | |
| Portland Pipe Line Corp | 173 | 173 | 173 | | |
| Project Five Pipe Line Corp | 150 | 150 | | 150 | |
| Pure Oil Pipe Line Co.—Penna | 45 | 45 | 45 | | |
| Pure Transportation Co | 1,294 | 432 | 425 | 7 | 862 |
| Richardson Pipe Line Co.[1] | | | | | |
| Rocky Mountain Pipe Line Co | 287 | 287 | 287 | | |
| Root Petroleum Co | 45 | | | | 45 |
| Salt Lake Pipe Line Co. (Nov. 3 to Dec. 31) | 214 | 186 | 186 | | 28 |
| Shamrock Oil & Gas Corp | 83 | 83 | | [5] 83 | |
| Shell Pipe Line Corp | 4,939 | 3,605 | 3,300 | 305 | 1,334 |
| Sinclair Refining Co | 14,117 | 8,252 | 6,063 | 2,189 | 5,865 |
| Socony-Vacuum Oil Co., Inc.—White Eagle Pipe Line Division | 118 | | | | 118 |
| Sohio Pipe Line Co | 2,604 | 1,379 | 1,379 | | 1,225 |
| Sohio Western Pipelines, Inc | 79 | | | | 79 |
| South West Pennsylvania Pipe Lines | 1,678 | 413 | 413 | | 1,265 |
| Southeastern Pipe Line Co | 479 | 479 | | 479 | |
| Southern Pipe Line Co | 268 | 268 | 268 | | |
| Stanolind Pipe Line Co | 11,309 | 8,330 | 8,330 | | 2,979 |
| Sun Pipe Line Co | 1,110 | 668 | 668 | | 442 |
| Sunray Oil Corp | 84 | 84 | | 84 | |
| Susquehanna Pipe Line Co | 865 | 865 | 3 | 862 | |
| Texas-Empire Pipe Line Co | 1,678 | 1,678 | 1,678 | | |
| Texas-New Mexico Pipe Line Co | 2,196 | 1,053 | 1,053 | | 1,143 |
| Texas Pipe Line Co | 7,099 | 4,315 | 3,949 | 366 | 2,784 |
| Tidal Pipe Line Co | 184 | 20 | 20 | | 164 |
| Tide-Water Pipe Co., Ltd | 576 | 576 | 576 | | |
| Toronto Pipe Line Co | 372 | 26 | 26 | | [7] 346 |
| Transit & Storage Co | 454 | 454 | 454 | | |
| Triangle Pipe Line Co | 142 | 134 | | 134 | 8 |
| Tuscarora Oil Co., Ltd | 622 | 622 | 61 | 561 | |
| Utah Oil Refining Co | 864 | 791 | 791 | | 73 |
| Wyco Pipe Line Co | 268 | 268 | | 268 | |

[1] Includes 44 miles leased from Richardson Pipe Line Co.
[2] Excludes 19 miles of Toronto Pipe Line Co.'s portion of jointly owned mileage.
[3] Includes 27 miles used in gathering refined oils.
[4] Excludes 83 miles of Shamrock Oil & Gas Corp.'s portion of jointly owned mileage.
[5] Nonoperating company. Mileage leased to Atlantic Pipe Line Co.
[6] Excludes 84 miles of Phillips Petroleum Co.'s portion of jointly owned mileage.
[7] Excludes 19 miles of Continental Pipe Line Co.'s portion of jointly owned mileage.

Largest 12 company mileages are checked.
Source: Interstate Commerce Commission.

TABLE G–8.—*Natural gas production, State of Texas, 1947, by 34 largest producers*

| | Thousand cubic feet produced (14.65 pounds per square inch) | Dry gas [1] | Casing-head gas |
|---|---|---|---|
| By independent producers: | | | |
| Phillips Petroleum Co | 255, 912, 135 | 231, 687, 884 | 24, 224, 251 |
| Humble Oil & Refining Co | 146, 755, 792 | 81, 403, 553 | 65, 352, 239 |
| J. S. Abercrombie Co | 100, 157, 962 | | 100, 157, 962 |
| Stanolind Oil & Gas Co | 76, 886, 948 | 33, 762, 457 | 43, 124, 491 |
| Shamrock Oil & Gas Corp | 75, 235, 897 | 75, 235, 897 | |
| Magnolia Petroleum Co | 57, 952, 816 | 35, 259, 218 | 22, 693, 598 |
| Chicago Corporation, The | 55, 914, 900 | 55, 914, 900 | |
| Gulf Oil Corp | 54, 903, 867 | | 54, 903, 867 |
| Tidewater Associated Oil Co | 32, 919, 838 | 16, 814, 704 | 16, 105, 134 |
| Skelly Oil Co | 31, 810, 232 | 23, 558, 015 | 8, 252, 217 |
| LaGloria Corp | 28, 291, 071 | 28, 291, 071 | |
| Sun Oil Co | 26, 459, 749 | 15, 079, 675 | 11, 380, 074 |
| Sinclair Prairie Oil Co | 24, 076, 474 | 14, 759, 454 | 9, 317, 020 |
| Hagy, Harrington & Marsh | 23, 887, 272 | 23, 887, 272 | |
| J. M. Huber Corp | 22, 681, 050 | 22, 681, 050 | |
| Continental Oil Corp | 20, 766, 978 | 9, 985, 855 | 10, 781, 123 |
| The Texas Co | 18, 900, 240 | | 18, 900, 240 |
| McCarthy Oil & Gas Co | 18, 549, 334 | 18, 549, 334 | |
| Shell Oil Co | 16, 903, 736 | | 16, 903, 736 |
| R. Lacy | 16, 814, 504 | 16, 814, 504 | |
| Abercrombie-Magnolia | 15, 439, 633 | | 15, 439, 633 |
| Kerr-McGee Oil Industries, Inc | 15, 249, 716 | 15, 249, 716 | |
| Atlantic Refining Co | 13, 775, 879 | | 13, 775, 879 |
| Warren Petroleum Corp | 10, 847, 673 | | 10, 847, 673 |
| Texas Pacific Coal & Oil Co | 8, 252, 218 | | 8, 252, 218 |
| Pure Oil Co | 5, 922, 963 | | 5, 922, 963 |
| Amerada Petroleum Corp | 5, 523, 662 | | 5, 523, 662 |
| Panhandle Producing and Refining Co | 2, 399, 702 | 2, 399, 702 | |
| Total 52.4 percent | 1, 183, 192, 241 | 721, 334, 261 | 461, 857, 980 |
| By Pipeline companies and affiliates: | | | |
| Canadian River Gas Co | 84, 606, 316 | 84, 606, 316 | |
| Texoma Natural Gas Co | 80, 869, 760 | 80, 869, 760 | |
| Cities Service Gas Co | 55, 335, 617 | 50, 410, 907 | 4, 924, 710 |
| Union Producing Co | 48, 174, 890 | 48, 174, 890 | |
| Arkansas-Louisiana Gas Co | 32, 427, 973 | 32, 427, 973 | |
| Lone Star Producing Co | 32, 161, 076 | 32, 161, 076 | |
| Panhandle Eastern Pipe Line Co | 30, 159, 348 | 30, 159, 348 | |
| Total 16.1 percent | 363, 734, 980 | 358, 810, 270 | 4, 924, 710 |
| Subtotal, 69.5 percent. | | | |
| All others, 31.5 percent [2] | 711, 091, 290 | 512, 372, 569 | 198, 718, 721 |
| Grand total | 2, 258, 018, 511 | 1, 592, 517, 100 | 665, 501, 411 |

[1] Sweet and sour dry gas.

[2] Other producers and pipeline companies not identified, but whose individual volumes were less than 2,400,000 M c. f. during year.

NOTE.—Does not include gas vented, flared or returned to formation and not subject to tax.

Source of data: Gross Receipts Division of Texas State Controller's Office.

TABLE G–9.—*List of producers making largest sales to interstate pipeline companies in the States of Arkansas, Kansas, Louisiana, Mississippi, New Mexico, Oklahoma, and Texas in the year 1947*

| | Volume | Amount | Per thousand cubic feet |
|---|---|---|---|
| | *Thousand cubic feet* | | *Cents* |
| Phillips Petroleum Co | [1] 116, 193, 615 | $4, 566, 892 | 3.9 |
| The Chicago Corp | 66, 654, 228 | 3, 327, 688 | 5.0 |
| Republic Natural Gas Co | 56, 444, 937 | 3, 011, 202 | 5.3 |
| Humble Oil & Refining Co | 49, 304, 966 | 2, 386, 313 | 4.8 |
| Stanolind Oil & Gas Co | 34, 800, 860 | 1, 279, 822 | 3.7 |
| Skelly Oil Co | 28, 253, 787 | 1, 208, 953 | 4.3 |
| Continental Oil Co | 27, 727, 813 | 1, 324, 110 | 4.8 |
| Gulf Oil Corp. and subsidiaries | 26, 517, 611 | 1, 163, 298 | 5.0 |
| Hagy, Harrington & Marsh | 26, 373, 591 | 1, 193, 423 | 4.5 |
| H. L. Hunt & Hassie Hunt Trust | 25, 976, 719 | 1, 593, 096 | 6.1 |
| Phillips Petroleum Co. and Continental Oil Co | 23, 486, 726 | 1, 174, 336 | 5.0 |
| Southern Carbon Co | 22, 674, 534 | 1, 686, 930 | 7.4 |
| United Carbon Co | 20, 277, 225 | 1, 527, 339 | 7.5 |
| Southwest Gas Producing Co | 14, 346, 864 | 895, 773 | 6.2 |
| Sun Oil Co | 13, 543, 415 | 578, 773 | 4.3 |
| Texas Gulf Producing Co | 12, 918, 120 | 613, 362 | 4.7 |
| Magnolia Petroleum Co | 12, 004, 785 | 496, 817 | 4.1 |
| Shell Oil Co | 11, 318, 971 | 486, 415 | 4.3 |
| Shamrock Oil & Gas Corp | 10, 760, 175 | 580, 723 | 5.4 |
| Fin-Ker Oil & Gas Production Co | 10, 375, 955 | 540, 675 | 5.2 |
| Glassell & Glassell | 10, 241, 074 | 307, 232 | 3.0 |
| Ray Stephens, Inc | 9, 942, 499 | 429, 200 | 4.3 |
| The Texas Co | 8, 734, 323 | 402, 089 | 4.6 |
| Barber Oil Co | 8, 677, 951 | 683, 209 | 7.9 |
| Barnsdall Oil Co | 8, 466, 043 | 396, 404 | 4.7 |
| Warren Petroleum Corp | 8, 430, 014 | 328, 045 | 3.8 |
| Superior Oil Co | 7, 682, 228 | 429, 099 | 5.6 |
| Western Natural Gas Co | [2] 7, 604, 981 | 283, 169 | 3.7 |
| Rogers Lacy et al | 7, 433, 579 | 378, 340 | 5.1 |
| Carter-Cragg Oil Co | 7, 334, 913 | 426, 265 | 5.8 |
| Southern Production Co | [3] 7, 382, 014 | 295, 281 | 4.0 |
| Big West Drilling Co | 6, 807, 579 | 306, 341 | 4.5 |
| Ohio Oil Co | 6, 721, 017 | 249, 417 | 3.7 |
| Pure Oil Co | 6, 327, 089 | 220, 594 | 3.5 |
| J. M. Huber Corp | 6, 163, 162 | 246, 526 | 4.0 |
| Sunray Oil Co | 6, 089, 459 | 222, 007 | 3.6 |
| Total | 733, 988, 922 | 35, 239, 158 | 4.8 |

[1] Exclusive of sales to Independent Natural Gas Co., an affiliate.
[2] Exclusive of sales to El Paso Natural Gas Co., an affiliate.
[3] Exclusive of sales to Southern Natural Gas Co., an affiliate.

Source: Federal Power Commission.

Interstate transmission in the natural gas industry is the phase of the industry in which the largest investments are required. In this field, therefore, the largest concerns may be found. Most of the major pipeline systems originate in one of the big gas fields of Texas and the Midcontinent and carry the gas north and east to the market centers. While some of the pipeline corporations own and produce their natural gas, the majority purchase it for transmission to distributing utilities.

United Gas Pipe Line Co. has the longest gas mileage and the greatest capacity, but several other large systems exceed it in mileage of large (over 20-inch) diameter pipelines, among them the Panhandle Eastern Pipe Line Co. with its extensive network feeding the industrial area of Michigan, the Tennessee Gas Transmission which supplies the Mid-Atlantic area, and the Texas Eastern Transmission Corp. which purchased the war-built "Big Inch" pipelines to carry gas to the New York-Philadelphia region. El Paso Natural Gas Co. owns the only major line which travels in the opposite direction, that is, from the Texas Panhandle to the west coast.

TABLE G–10.—*Selected operating statistics of major pipeline systems, 1949*

| Name of pipeline system | Map code No. | Compressor facilities | | Miles of transmission mains | | | | Maximum daily capacity | 1949 operating revenues | Terminals |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of stations | Installed horsepower | Total | 10 inches and under diameter | 10.1 to 20.0 inches diameter | 20.1 inches in over diameter | | | |
| | | | | | | | | *Million cubic feet* | *Millions* | |
| Atlantic Seaboard—Virginia Gas Transmission Corp. | 1 | 5 | 20,425 | 463 | 42 | 421 | 0 | 90 | $7.0 | Pike County, Ky.—Pennsylvania-Maryland State line in Cecil County, Md. |
| Canadian River—Colorado Interstate Gas Co. | 2 | 10 | 57,715 | 857 | 211 | 407 | 239 | ---------- | 12.5 | Hugoton and Amarillo fields—Denver. |
| Cities Service Gas Co | 3 | 24 | 123,940 | 4,466 | 1,651 | 2,195 | 620 | [1] 792 | 30.7 | Hugoton, Panhandle and Cement (Oklahoma) fields — Kansas City, Springfield and St. Joseph, Mo.; Superior, Nebr. |
| El Paso Natural Gas Co | 4 | 25 | 245,750 | 3,601 | 1,056 | 1,303 | 1,242 | [1] 615 | 28.3 | Panhandle field—Yuma, Ariz.; Blythe, Calif. |
| Interstate Natural Gas Co | 5 | 2 | 20,100 | 730 | 98 | 383 | 249 | ([2]) | 12.0 | North Tepertate (Louisiana) and Monroe fields—Baton Rouge, La. |
| Michigan Wisconsin Pipeline Co | 6 | 4 | 26,600 | 1,304 | 147 | 0 | 1,157 | [1] 95 | [3] 2.3 | Hugoton field—Milwaukee and Madison, Wis.; Austin storage field, Michigan. |
| Mississippi River Fuel Co | 7 | 11 | 70,425 | 1,244 | 240 | 109 | 895 | 266 | 14.6 | Monroe field—St. Louis, Mo.; Alton, Ill. |
| New York State Natural Gas Corp | 8 | 5 | 14,950 | 693 | 78 | 615 | 0 | [1] 142 | 12.5 | Brave, Pa.—Caledonia, Auburn, N. Y. |
| Northern Natural Gas Co | 9 | 21 | 144,540 | 3,619 | 1,321 | 1,221 | 1,077 | [1] 520 | 25.6 | Hugoton and Panhandle fields—Minneapolis, St. Paul, Minn. |
| Panhandle Eastern Pipe Line Co | 10 | 22 | 231,515 | 4,246 | 902 | 967 | 2,377 | 508 | 35.4 | Hugoton and Panhandle fields—Detroit, Kalamazoo, Saginaw, Mich. |
| Southern Natural Gas Co | 11 | 14 | 104,170 | 2,149 | 504 | 996 | 649 | 420 | 22.5 | Logansport, Monroe and Gwinville (Mississippi) fields—Columbus, Macon, Ga. |
| Tennessee Gas Transmission Co | 12 | 15 | 241,600 | 2,987 | 87 | 322 | 2,578 | 710 | 41.2 | San Salvador and Carthage (Texas) fields—Cornwell Station, W. Va. |
| Texas Eastern Transmission Corp | 13 | 26 | 278,150 | 3,165 | 85 | 1,706 | 1,374 | 508 | 44.7 | Longview and Houston, Tex.—Philadelphia and New York. |
| Texas Gas Transmission Co | 14 | 10 | 48,200 | 2,040 | 835 | 598 | 607 | 297 | 10.0 | Carthage and Monroe fields—Jackson, Tenn.; Bowling Green, Ky.; Terre Haute, Ind. |
| Texoma—Natural Gas Pipeline Co.—Chicago District Pipeline Co. | 15 | 17 | 154,915 | 2,321 | 98 | 333 | 1,890 | 510 | 21.9 | Hugoton and Panhandle fields—Chicago. |
| United Gas Pipe Line Co | 16 | 31 | 70,135 | 6,743 | 3,234 | 3,232 | 277 | [1] 2,442 | 54.2 | Laredo, Austin, Fort Worth, New Orleans, Pensacola; Monroe and Panhandle fields—Wichita Falls, Tex. |

[1] Maximum daily sendout, 1949. [2] Not available. [3] 2 months operations only in 1949.

NOTE.—Includes pipeline systems with more than 450 miles of transmission mains and $5,000,000 operating revenues. See ch. 8 for locations of individual systems.

Source: American Gas Association, Gas Facts 1949.

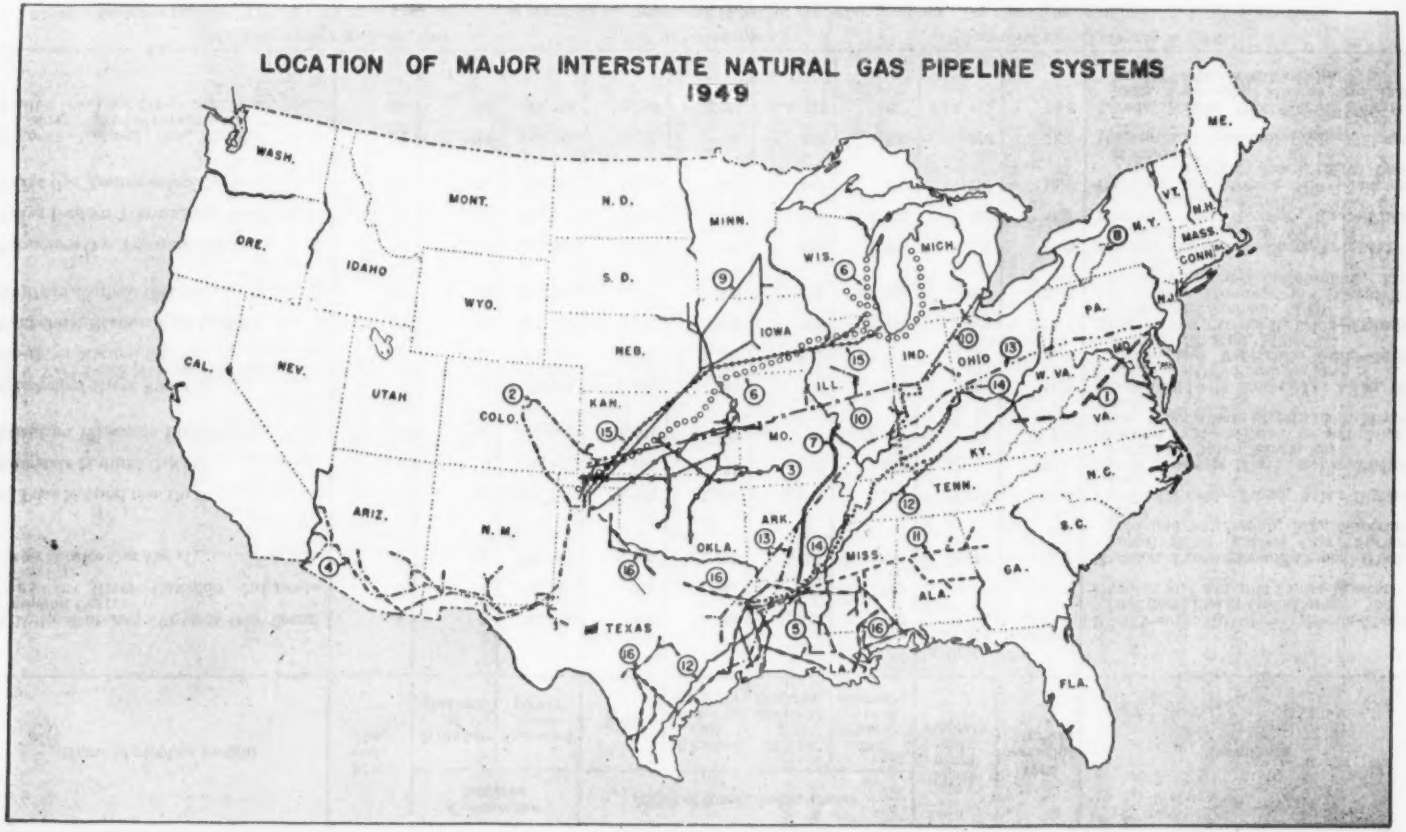
FIGURE G–1.

* Maximum daily sendout, 1949. ** Not available. *** 2 months operations only in 1949.

NOTE.—Includes pipeline systems with more than 450 miles of transmission mains and $5,000,000 operating revenues. See ch. 8 for locations of individual systems.

Source: American Gas Association, Gas Facts 1949.

FIGURE G–1.




Source: American Gas Association, Gas Facts, 1949.

TABLE G–11.—*Selected operating statistics of major pipeline systems, 1949*

| Name of pipeline system | Map code No. | Compressor facilities: Number of stations | Compressor facilities: Installed horsepower | Miles of transmission mains: Total | Miles of transmission mains: 10 inches and under in diameter | Miles of transmission mains: 10.1 to 20.0 inches in diameter | Miles of transmission mains: 20.1 inches and over in diameter | Maximum daily capacity | 1949 operating revenues | Terminals |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | *Million cubic feet* | *Millions* | |
| Atlantic Seaboard—Virginia Gas Transmission Corp. | 1 | 5 | 20,425 | 463 | 42 | 421 | 0 | 90 | $7.0 | Pike County, Ky.—Pennsylvania-Maryland State line in Cecil County, Md. |
| Canadian River—Colorado Interstate Gas Co. | 2 | 10 | 57,715 | 857 | 211 | 407 | 239 | ---------- | 12.5 | Hugoton and Amarillo fields—Denver. |
| Cities Service Gas Co | 3 | 24 | 123,940 | 4,466 | 1,651 | 2,195 | 620 | [1] 792 | 30.7 | Hugoton, Panhandle and Cement (Oklahoma) fields—Kansas City, Springfield and St. Joseph, Mo.; Superior, Nebr. |
| El Paso Natural Gas Co | 4 | 25 | 245,750 | 3,601 | 1,056 | 1,303 | 1,242 | [1] 615 | 28.3 | Panhandle field—Yuma, Ariz.; Blythe, Calif. |
| Interstate Natural Gas Co | 5 | 2 | 20,100 | 730 | 98 | 383 | 249 | [2] | 12.0 | North Tepertate (Louisiana) and Monroe fields—Baton Rouge, La. |
| Michigan Wisconsin Pipeline Co | 6 | 4 | 26,600 | 1,304 | 147 | 0 | 1,157 | [1] 95 | [3] 2.3 | Hugoton field—Milwaukee and Madison, Wis.; Austin storage field, Michigan. |
| Mississippi River Fuel Co | 7 | 11 | 70,425 | 1,244 | 240 | 109 | 895 | 266 | 14.6 | Monroe field—St. Louis, Mo.; Alton, Ill. |
| New York State Natural Gas Corp | 8 | 5 | 14,950 | 693 | 78 | 615 | 0 | [1] 142 | 12.5 | Brave, Pa.—Caledonia, Auburn, N. Y. |
| Northern Natural Gas Co | 9 | 21 | 144,540 | 3,619 | 1,321 | 1,221 | 1,077 | [1] 520 | 25.6 | Hugoton and Panhandle fields—Minneapolis, St. Paul, Minn. |
| Panhandle Eastern Pipe Line Co | 10 | 22 | 231,515 | 4,246 | 902 | 967 | 2,377 | 508 | 35.4 | Hugoton and Panhandle fields—Detroit, Kalamazoo, Saginaw, Mich. |
| Southern Natural Gas Co | 11 | 14 | 104,170 | 2,149 | 504 | 996 | 649 | 420 | 22.5 | Logansport, Monroe, and Gwinville (Mississippi) fields—Columbus, Malcon, Ga. |
| Tennessee Gas Transmission Co | 12 | 15 | 241,600 | 2,987 | 87 | 322 | 2,578 | 710 | 41.2 | San Salvador and Carthage, Tex. fields—Cornwell Station, W. Va. |
| Texas Eastern Transmission Corp | 13 | 26 | 278,150 | 3,165 | 85 | 1,706 | 1,374 | 508 | 44.7 | Longview and Houston, Tex.—Philadelphia and New York. |
| Texas Gas Transmission Co | 14 | 10 | 48,200 | 2,040 | 835 | 598 | 607 | 297 | 10.0 | Carthage and Monroe fields—Jackson, Tenn.; Bowling Green, Ky.; Terre Haute, Ind. |
| Texoma—Natural Gas Pipeline Co.—Chicago District Pipeline Co. | 15 | 17 | 154,915 | 2,321 | 98 | 333 | 1,890 | 510 | 21.9 | Hugoton and Panhandle fields—Chicago. |
| United Gas Pipe Line Co | 16 | 31 | 70,135 | 6,743 | 3,234 | 3,232 | 277 | [1] 2,442 | 54.2 | Laredo, Austin, Fort Worth, New Orleans, Pensacola; Monroe and Panhandle fields—Wichita Falls, Tex. |

[1] Maximum daily send-out, 1949 [2] Not available. [3] 2 months operations only in 1949.

NOTE.—Includes pipeline systems with more than 450 miles of transmission mains and $5,000,000 operating revenues. See chart 8 for locations of individual systems.

Source: American Gas Association, Gas Facts, 1949.

*Electric power*

An analysis of data from the United States Federal Power Commission for the year 1949 shows clearly that the major portion of electric power output was produced by a few major utility firms.

On the total electrical energy generated in the United States in 1949, 82.4 percent came from 339 utility systems, both private and publicly owned. Inasmuch as there were almost 4,000 separate private and public systems, less than 10 percent accounted for most of the generation.

Among private utility companies, 316, a little over one-third of the total number of 858 systems, produced 99.8 percent of the energy generated. In the field of public electric power generation, 23 systems (including such as the Tennessee Valley Authority, United States Bureau of Reclamation, United States Southwestern Power Administration) generated 83.7 percent of all the energy produced by a total of 3,125 separate public systems.

*Major concerns.*—In electric power production, 184 electric utility systems and operating pools, both public and private, supply over 98 percent of the total electric energy produced for public use in the United States.

The biggest utilities in the country, listed as to size according to the number of customers, are shown below. In addition to these, the Department of Interior and the Tennessee Valley Authority are the biggest of the public power agencies.

*Utility and location—*

Consolidated Edison Co., New York, N. Y.
Pacific Gas & Electric Co., San Francisco, Calif.
Public Service Electric & Gas Co., Newark, N. J.
Commonwealth Edison Co., Chicago, Ill.
Detroit Edison Co., Detroit, Mich.
Southern California Edison Co., Los Angeles, Calif.
Philadelphia Electric Co., Philadelphia, Pa.
Niagara-Mohawk Power Corp., Syracuse, N. Y.
Los Angeles Department of Water and Power, Los Angeles, Calif.
Consumers Power Co., Jackson, Miss.
Duke Power Co., Charlotte, N. C.
Pennsylvania Power & Light Co., Allentown, Pa.
Virginia Electric & Power Co., Richmond, Va.
Northern States Power Co., Minneapolis, Minn.
Boston Edison Co., Boston, Mass.
Public Service Co. of Northern Illinois, Chicago, Ill.
Union Electric Co. of Missouri, St. Louis, Mo.
Cleveland Electric Illuminating Co., Cleveland, Ohio.
Duquesne Light Co., Pittsburgh, Pa.
Consolidated Gas, Electric Light & Power Co., Baltimore

† Maximum daily send-out, [illegible]

NOTE.—Includes pipeline systems with more than 450 miles of transmission mains and $5,000,000 operating revenues. See chart 8 for locations of companies.

Source: American Gas Association, Gas Facts, 1949.

## CHAPTER III

## RESERVES AND AVAILABILITY

In any discussion or description of reserves, it is of the utmost importance to distinguish between the various meanings of the term. Primarily, the distinction is between basic reserves and recoverable reserves.

Basic reserves are classified according to the extent of the knowledge about them—such as measured, indicated, or inferred reserves; according to their quality, size, accessibility, and location. Basic reserves are those which are "known" to be present in the accessible part of the earth's crust. They can be estimated, computed, or inferred with varying degrees of accuracy depending upon the availability of geologic data. This type of estimate will not necessarily have any relation to the amounts which may be economically recovered for consumption at a certain stage of technological development.

Basic reserves, once estimated, are subject to change as a result of new discoveries, accessions of geologic data, and basic changes in technology.

Recoverable reserves are only that part of basic reserves of any resource, which can be produced under present technologic and economic conditions. This quantity varies with technique of recovery, with price, with utilization, and other economic factors. Obviously, this category of reserves is much smaller for each fuel than the quantity of basic reserve.

Much confusion can be avoided with a proper application of these classifications to the popularly known reserve estimates for our several mineral fuels.

One reason why the estimates for our coal reserve are large compared with the estimates for oil and gas is the wholly different concept employed in their measurement. The only existing national estimate for coal, for instance, was made more than 30 years ago. It includes not only measured coal, but also coal whose presence was merely indicated or inferred. It includes coals under overburdens too great and in seams too thin or irregular to permit economical recovery at the present time. It does not adequately classify the coals by rank and quality. Since 1948 the United States Geological Survey has been engaged in a 10-year project of reappraisal of our coal reserves. By restricting its estimates to areas about which sufficient geologic information is available to permit a realistic evaluation of the reserves, by employing standardized, detailed classifications with respect to extent of knowledge about the reserves, their rank, their thickness, size, the amount of overburden, and the amounts which can be recovered, the survey is producing estimates of considerable reliability.

Oil and gas reserves, as commonly quoted, are proved reserves—a

category similar in coal to the "measured" plus a small amount of "indicated" reserves—recoverable under presently known techniques. Oil and gas are mobile until their motion is arrested by the peculiarities of geological structures such as by traps in the rocks and sand layers at which locations they accumulate only to be disturbed again when wells permit the liquid or gaseous substance to escape. On the other hand, the underground occurrence of coal is in solid layers of relatively stable, determinable extent. Oil and gas reserves, therefore, can be estimated as proved reserves only when wells have located and determined something of the nature of the underground reservoir. Inferral of oil and gas reserves, therefore, other than those immediately tapped by the well is relatively uncertain. For this reason, initial estimates of newly discovered oil pools and gas fields usually amount to much smaller quantities than later additional so-called development wells will prove to exist in the field. These two factors explain why future exploratory effort in oil and gas will continue to add to the present proved reserves—as long as oil and gas are to be found. In coal, on the other hand, more careful exploratory work, because of the generally over optimistic early estimates, will continue to cut down totals to more realistic size.

A specific example will serve to illustrate this last point: Estimates placed the coal remaining in the ground in the United States as of January 1, 1948, at 3.1 trillion tons. On the basis of revisions of varying thoroughness in the reserve estimates of only 10 States since that time, this figure has been cut down to 2.4 trillion tons as the total remaining on January 1, 1950, a reduction of almost one-fourth. Only half of this amount or 1.2 trillion tons is estimated to be potentially recoverable, the other half is lost in mining. In order to arrive at an even more conservative quantity, all but measured or indicated coal in beds of certain thickness (28 inches) and under less than 2,000 feet overburden was excluded. On the basis of calculations for the five States for which careful new surveys have been made, this last category amounts to about 30 percent of the total reserves of those States. Using this formula, that leaves 364 billion short tons as assured recoverable reserves of coal in the United States.

The degree to which continued additions of geological data can cut down the reserve estimates of a single State is well illustrated by the new survey for the State of Wyoming. According to the old estimates, Wyoming had original coal reserves of 30.6 billion tons of bituminous, 590.1 billion tons of subbituminous, or a total of 620.7 billion tons. Subtracting from this total coal produced, 620.4 billion tons was left in the ground as of January 1, 1948. At that time, the Geological Survey completed its new survey. First it found that for 53 percent of the area in which it knew coal existed, sufficient data were not available to permit any reliable estimate. In the 47 percent of the coal-bearing area of the State which the Survey covered it estimated original reserves at 13.2 billion tons of bituminous, and 108.3 billion tons of subbituminous coal, for a total original reserve of 121.5 billion tons. After subtracting production through 1949, the remaining reserve as of January 1, 1950, was 120.8 billion tons of coal. Thus on the basis of 50 percent recovery, the recoverable coal reserves as of that date amount to 60.4 billion tons. By further subtracting those reserves which are only inferred—rather than measured or indicated—there remain 21.9 billion tons of assured recoverable

coal reserves. From this conservative estimate as the core, new information on the geology of the State of Wyoming will more likely increase rather than further decrease this amount, bearing out the parallelism between this category of reserve and the category of proved oil and gas reserves. Inasmuch as the remaining 53 percent of the State is known also to contain coal, additional work is certain to increase the over-all State total assured reserves. In addition, as industrial development takes place in that region, as prices of fuel go up, and as improved techniques of recovery are devised, the State total of assured reserves will undoubtedly increase.

When comparisons are attempted between the coal reserves of the different States, it must be remembered that for the States of Wyoming, Montana, Michigan, New Mexico, and North Carolina, the new revised data of the Geological Survey are really entirely different estimates qualitatively from the old estimates for the other States. They should therefore not be compared quantitatively with each other until the remaining States have been reappraised and until estimates are available for them on the same basis as for the five resurveyed States.

### 1. Reserves

*Liquid fuels*

Estimated proved reserves of crude oil in the United States have been estimated as of December 31, 1949, at slightly over 24.6 billion barrels by the American Petroleum Institute (H–1). Proved reserves of natural-gas liquids, including condensates, natural gasoline, and liquefied petroleum gases have been estimated by the same authority around 3.7 billion barrels (H–2). Thus, the total proved reserves of liquid hydrocarbons in the United States amounted to almost 28.4 billion barrels (H–3).

Both categories show a net increase over the estimate of the previous year. Crude oil shows a net increase of 1,369,045,000 barrels and natural gas liquids, a net increase of 188,229,000 barrels. Texas accounts for about 55 percent of the total reserves and for 70 percent of the net increase in crude-oil reserves. California has about 28 percent, Louisiana 14 percent, Kansas and Wyoming about 5 percent each of the total crude-oil reserves. In the reserves of the natural-gas liquids, Texas again leads with 57 percent, followed by Louisiana with 16 percent, California with 8.56 percent and Oklahoma with 6.3 percent.

The increases are calculated on the basis of extension and revisions of former estimates and the discovery of new fields and of new pools in old fields.

As shown by table H–1 the American Petroleum Institute's annual estimates, 1937 to 1949, of crude-oil reserves have shown a continuous adjustment upward with the exception of the late war years 1943, 1944, and 1945. During the whole period, the estimated reserves have nearly doubled although the estimates, from 1937 through 1945, did not include all classes of natural-gas liquids.

The percentage of total liquid hydrocarbons and natural-gas reserves in the United States as of January 1, 1950, by regions is given as follows:

| Region | Percentage of total liquid hydrocarbon reserves | Percentage of total natural-gas reserves |
|---|---|---|
| Pacific coast | 14.6 | 5.5 |
| Rocky Mountain | 6.8 | 5.8 |
| Mid-continent [1] | 9.7 | 14.7 |
| Texas and Gulf Coast States [2] | 65.6 | 71.3 |
| Northeastern United States [3] | 3.3 | 2.7 |
| Total | 100.0 | 100.0 |

[1] Oklahoma, Arkansas, Kansas, and Nebraska (Nebraska not included in natural-gas reserves).
[2] Excluding Florida.
[3] Including Illinois, Indiana, Kentucky, and Michigan.

There are some oil reserves in Alaska of unproven quantity. The remoteness of Arctic Alaska from points of consumption has prevented any commercial development and there has been no production in Alaska since the destruction by fire in 1933 of a small refinery utilizing petroleum produced in the Katalla field on the Gulf of Alaska. One hundred fifty-four thousand barrels were produced from 1902 to 1933.

During the last decade the Eastern Hemisphere has become increasingly significant in terms of oil resources. The reserves in the Middle East are estimated at 49.2 billion barrels by the Oil and Gas Division of the United States Department of the Interior (table H–8) as of December 31, 1949. Of these reserves, United States interests control entirely 11.5 billion barrels in Saudi Arabia and Bahrein. They control 43.43 percent of all Middle East reserves for a total of 21.36 billion barrels.

World reserves of petroleum are indicated in the table H–6 which reveals that the United States possesses 33.09 percent of the world's proven reserves or 25,909,000,000 barrels.

TABLE H–1.—*Proved reserves of crude oil in the United States, as estimated by the American Petroleum Institute*

[Thousands of barrels]

| Year | Proved reserves at beginning of year (1) | Changes in proved reserves due to extensions (new crude oil) and revisions during year (2) | Proved reserves discovered in new fields and in new pools in old fields during year (3) | Production during year (4) | Proved reserves as of end of year (columns 1, 2, and 3 less column 4) (5) | Changes in reserves during year (column 5 less column 1) (6) |
|---|---|---|---|---|---|---|
| 1937 | 13,063,400 | 2,702,790 | 928,742 | 1,277,664 | 15,507,268 | 2,443,868 |
| 1938 | 15,507,268 | 2,243,571 | 810,493 | 1,213,186 | 17,348,146 | 1,840,878 |
| 1939 | 17,348,146 | 2,058,455 | 340,667 | 1,264,256 | 18,483,012 | 1,134,875 |
| 1940 | 18,483,012 | 1,607,012 | 286,338 | 1,351,847 | 19,024,515 | 541,503 |
| 1941 | 19,024,515 | 1,538,989 | 429,974 | 1,404,182 | 19,589,296 | 564,781 |
| 1942 | 19,589,296 | 1,618,925 | 260,051 | 1,385,479 | 20,082,793 | 493,497 |
| 1943 | 20,082,793 | 1,202,368 | 282,418 | 1,503,427 | 20,064,152 | |
| 1944 | 20,064,152 | 1,556,192 | 511,308 | 1,678,421 | 20,453,231 | 389,079 |
| 1945 | 20,453,231 | 1,690,315 | 419,984 | 1,736,717 | 20,826,813 | 373,582 |
| 1946 | 19,941,846 | 2,413,628 | 244,434 | 1,726,348 | 20,873,560 | 931,714 |
| 1947 | 20,873,560 | 2,019,140 | 445,430 | 1,850,445 | 21,487,685 | 614,125 |
| 1948 | 21,487,685 | 3,398,726 | 396,481 | 2,002,448 | 23,280,444 | 1,792,759 |
| 1949 | 23,280,444 | 2,297,428 | 890,417 | 1,818,800 | 24,649,489 | 1,369,045 |

Source: American Petroleum Institute.

TABLE H–2.—*Estimated proved reserves of natural gas liquids in the United States*

[Includes condensate, natural gasoline, and liquefied petroleum gases]

[Barrels of 42 United States gallons]

| | Proved reserves as of Dec. 31, 1948 | Changes in proved reserves due to extensions (new natural gas liquids) and revisions during 1949 | Proved reserves discovered in new fields and in new pools in old fields in 1949 [1] | Production during 1949 | Proved reserves as of Dec. 31, 1949 (columns 1+2+3 less column 4) | Changes in reserves during 1949 (column 5 less column 1) |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Alabama [2] | | | | | | |
| Arkansas | 57, 457, 000 | 1, 149, 000 | 128, 000 | 3, 092, 000 | 55, 642, 000 | −1, 815, 000 |
| California | 307, 908, 000 | 29, 996, 000 | 9, 560, 000 | 27, 189, 000 | 320, 275, 000 | 12, 367, 000 |
| Colorado | 36, 299, 000 | −5, 307, 000 | 25, 000 | 6, 827, 000 | 24, 190, 000 | −12, 109, 000 |
| Illinois | 24, 162, 000 | 6, 238, 000 | 81, 000 | 3, 815, 000 | 26, 666, 000 | 2, 504, 000 |
| Indiana | 108, 000 | 29, 000 | 20, 000 | 31, 000 | 126, 000 | 18, 000 |
| Kansas | 102, 344, 000 | 6, 573, 000 | 113, 000 | 2, 625, 000 | 106, 405, 000 | 4, 061, 000 |
| Kentucky | 14, 401, 000 | 315, 000 | 157, 000 | 1, 628, 000 | 13, 245, 000 | −1, 156, 000 |
| Louisiana | 524, 096, 000 | 81, 174, 000 | 17, 821, 000 | 26, 669, 000 | 596, 422, 000 | 72, 326, 000 |
| Michigan | 1, 066, 000 | 238, 000 | 18, 000 | 119, 000 | 1, 203, 000 | 137, 000 |
| Mississippi | 57, 564, 000 | 1, 440, 000 | 101, 000 | 2, 698, 000 | 56, 407, 000 | −1, 157, 000 |
| Montana | 4, 000, 000 | −80, 000 | 20, 000 | 230, 000 | 3, 710, 000 | −290, 000 |
| New Mexico | 80, 247, 000 | 9, 152, 000 | 736, 000 | 4, 416, 000 | 85, 719, 000 | 5, 472, 000 |
| New York [2] | | | | | | |
| Ohio | 1, 664, 000 | 119, 000 | 13, 000 | 126, 000 | 1, 670, 000 | 6, 000 |
| Oklahoma | 200, 388, 000 | 43, 062, 000 | 7, 952, 000 | 17, 372, 000 | 234, 030, 000 | 33, 642, 000 |
| Pennsylvania | 2, 645, 000 | 158, 000 | 79, 000 | 239, 000 | 2, 643, 000 | −2, 000 |
| Texas | 2, 074, 674, 000 | 110, 442, 000 | 54, 794, 000 | 96, 199, 000 | 2, 143, 711, 000 | 69, 037, 000 |
| Utah [3] | 209, 000 | 7, 000 | 2, 000 | 10, 000 | 208, 000 | −1, 000 |
| West Virginia | 15, 214, 000 | 1, 107, 000 | 369, 000 | 3, 859, 000 | 12, 831, 000 | −2, 383, 000 |
| Wyoming | 36, 307, 000 | 8, 416, 000 | 540, 000 | 1, 400, 000 | 43, 863, 000 | 7, 556, 000 |
| Miscellaneous [3] | 30, 000 | −17, 000 | 36, 000 | 3, 000 | 46, 000 | 16, 000 |
| Total United States | 3, 540, 783, 000 | 294, 211, 000 | 92, 565, 000 | 198, 547, 000 | 3, 729, 012, 000 | 188, 229, 000 |

[1] Only a limited area is assigned to each new discovery, even though the committee may believe that eventually a much larger area will produce; for, in this report, the concern is only with actually proved reserves.

[2] Included in "Miscellaneous."

[3] In our report for Dec. 31, 1948, the reserves under "Miscellaneous," which included Alabama, Florida, New York, and Utah were recorded in column 5, table 3 as 239,000 barrels. In our present report Utah, with 209,000 barrels out of this 239,000 barrels is listed separately, the other three States still remaining under "Miscellaneous."

Source: Joint Report of American Gas Association and American Petroleum Institute, December 1949.

TABLE H–3.—*Estimated proved reserves of liquid hydrocarbons in the United States*

[Barrels of 42 United States gallons]

| | Proved reserves as of Dec. 31, 1948 (1) | Changes in proved reserves due to extensions (new oil) and revisions during 1949 (2) | Proved reserves discovered in new fields and in new pools in old fields in 1949 [1] (3) | Production during 1949 (see footnote at bottom of p. 5) (4) | Proved reserves as of Dec. 31, 1949 (columns 1+2+3 less column 4) (5) | Changes in reserves during 1949 (column 5 less column 1) (6) |
|---|---|---|---|---|---|---|
| Alabama [2] | 3,547,000 | 448,000 | | 448,000 | 3,547,000 | |
| Arkansas | 357,499,000 | 24,279,000 | 2,540,000 | 31,213,000 | 353,105,000 | −4,394,000 |
| California | 4,071,491,000 | 255,911,000 | 175,755,000 | 360,131,000 | 4,143,026,000 | 71,535,000 |
| Colorado | 401,757,000 | −2,588,000 | 75,000 | 30,242,000 | 369,002,000 | −32,755,000 |
| Illinois | 417,527,000 | 133,147,000 | 11,897,000 | 67,767,000 | 494,804,000 | 77,277,000 |
| Indiana | 49,187,000 | 2,776,000 | 7,875,000 | 9,503,000 | 50,335,000 | 1,148,000 |
| Kansas | 776,739,000 | 142,952,000 | 27,868,000 | 102,764,000 | 844,795,000 | 68,056,000 |
| Kentucky | 73,610,000 | 3,190,000 | 3,697,000 | 11,084,000 | 69,413,000 | −4,197,000 |
| Louisiana | 2,393,386,000 | 260,873,000 | 61,516,000 | 209,584,000 | 2,506,191,000 | 112,805,000 |
| Michigan | 70,449,000 | 9,681,000 | 4,235,000 | 16,666,000 | 67,699,000 | −2,750,000 |
| Mississippi | 423,010,000 | 72,474,000 | 2,215,000 | 38,432,000 | 459,267,000 | 36,257,000 |
| Montana | 122,944,000 | 2,747,000 | 292,000 | 9,880,000 | 116,103,000 | −6,841,000 |
| Nebraska | 865,000 | 400,000 | 650,000 | 291,000 | 1,624,000 | 759,000 |
| New Mexico | 632,478,000 | 55,356,000 | 42,002,000 | 51,895,000 | 677,941,000 | 45,463,000 |
| New York [2] | 67,116,000 | | | 4,216,000 | 62,900,000 | −4,216,000 |
| Ohio | 30,206,000 | 2,765,000 | 13,000 | 3,611,000 | 29,373,000 | −833,000 |
| Oklahoma | 1,450,789,000 | 240,302,000 | 41,008,000 | 168,151,000 | 1,563,948,000 | 113,159,000 |
| Pennsylvania | 112,451,000 | 5,158,000 | 79,000 | 11,689,000 | 105,999,000 | −6,452,000 |
| Texas | 14,558,892,000 | 1,340,319,000 | 586,778,000 | 832,546,000 | 15,653,443,000 | 1,094,551,000 |
| Utah | 1,016,000 | 15,057,000 | 602,000 | 636,000 | 16,039,000 | 15,023,000 |
| West Virginia | 51,911,000 | 4,107,000 | 1,494,000 | 6,689,000 | 50,823,000 | −1,088,000 |
| Wyoming | 752,094,000 | 20,350,000 | 12,355,000 | 49,334,000 | 735,465,000 | −16,629,000 |
| Miscellaneous [3] | 2,263,000 | 1,935,000 | 36,000 | 575,000 | 3,659,000 | 1,396,000 |
| Total United States | 26,821,227,000 | 2,591,639,000 | 982,982,000 | 2,017,347,000 | 28,378,501,000 | 1,557,274,000 |

[1] Only a limited area is assigned to each new discovery, even though the committee may believe that eventually a much larger area will produce; for, in this report, the concern is only with actually proved reserves.

[2] Crude oil only; natural gas liquids not separable from miscellaneous grouping in table 3.

[3] Includes Alabama and New York natural gas liquids; Missouri, Tennessee, and Virginia crude; and Florida crude and natural gas liquids. Utah, which was included in "Miscellaneous" last year, is shown separately in this report.

Source: Joint Report of American Gas Association and American Petroleum Institute, December 1949.

TABLE H–4.—*Summary of API committee's annual reports covering period 1937–49*

[Barrels of 42 United States gallons]

PROVED RESERVES AS REPORTED PRIOR TO 1946

| | New oil found during year | | | | Estimated proved reserves as of end of year | Increase over previous year |
|---|---|---|---|---|---|---|
| | Through revisions of previous estimates and extensions to known fields | Through discoveries of new fields and of new pools in old fields | Total through new discoveries, extensions, and revisions (columns 1+2) | Production during year (see footnote at bottom of p. 5) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1936 | | | | | 13,063,400,000 | |
| 1937 | 2,792,790,000 | 928,742,000 | 3,721,532,000 | 1,277,644,000 | 15,507,268,000 | 2,443,868,000 |
| 1938 | 2,243,571,000 | 810,493,000 | 3,054,064,000 | 1,213,186,000 | 17,348,146,000 | 1,840,878,000 |
| 1939 | 2,058,455,000 | 340,667,000 | 2,399,122,000 | 1,264,256,000 | 18,483,012,000 | 1,134,866,000 |
| 1940 | 1,607,012,000 | 286,338,000 | 1,893,350,000 | 1,351,847,000 | 19,024,515,000 | 541,503,000 |
| 1941 | 1,538,989,000 | 429,974,000 | 1,968,963,000 | 1,404,182,000 | 19,589,296,000 | 564,781,000 |
| 1942 | 1,618,925,000 | 260,051,000 | 1,878,976,000 | 1,385,479,000 | 20,082,793,000 | 493,497,000 |
| 1943 | 1,202,368,000 | 282,418,000 | 1,484,786,000 | 1,503,427,000 | 20,064,152,000 | −18,641,000 |
| 1944 | 1,556,192,000 | 511,308,000 | 2,067,500,000 | 1,678,421,000 | 20,453,231,000 | 389,079,000 |
| 1945 | 1,690,315,000 | 419,984,000 | 2,110,299,000 | 1,736,717,000 | 20,826,813,000 | 373,582,000 |
| Dec. 31, 1945 [1] | | | | | [2] 19,941,846,000 | |

PROVED RESERVES AS REPORTED FOR 1946 AND THEREAFTER

CRUDE OIL ONLY

| | | | | | | |
|---|---|---|---|---|---|---|
| 1946 | 2,413,628,000 | 244,434,000 | 2,658,062,000 | 1,726,348,000 | 20,873,560,000 | 931,714,000 |
| 1947 | 2,019,140,000 | 445,430,000 | 2,464,570,000 | 1,850,445,000 | 21,487,685,000 | 614,125,000 |
| 1948 | 3,398,726,000 | 396,481,000 | 3,795,207,000 | 2,002,448,000 | 23,280,444,000 | 1,792,759,000 |
| 1949 | 2,297,428,000 | 890,417,000 | 3,187,845,000 | 1,818,800,000 | 24,649,489,000 | 1,369,045,000 |

NATURAL GAS LIQUIDS ONLY

| | | | | | | |
|---|---|---|---|---|---|---|
| 1946 | [3] | [3] | [3] | [3] | 3,163,219,000 | |
| 1947 | 192,237,000 | 59,301,000 | 251,538,000 | 160,782,000 | 3,253,975,000 | 90,756,000 |
| 1948 | 405,874,000 | 64,683,000 | 470,557,000 | 183,749,000 | 3,540,783,000 | 286,808,000 |
| 1949 | 294,211,000 | 92,565,000 | 386,776,000 | 198,547,000 | 3,729,012,000 | 188,229,000 |

TOTAL LIQUID HYDROCARBONS

| | | | | | | |
|---|---|---|---|---|---|---|
| 1946 | [3] | [3] | [3] | [3] | 24,036,779,000 | |
| 1947 | 2,211,377,000 | 504,731,000 | 2,716,108,000 | 2,011,227,000 | 24,741,660,000 | 704,881,000 |
| 1948 | 3,804,600,000 | 461,164,000 | 4,265,764,000 | 2,186,197,000 | 26,821,227,000 | 2,079,567,000 |
| 1949 | 2,591,639,000 | 982,982,000 | 3,574,621,000 | 2,017,347,000 | 28,378,501,000 | 1,557,274,000 |

[1] Up to and including its figures on proved reserves of petroleum, as of Dec. 31, 1945, the committee combined under that heading the estimated proved reserves of cycle-plant and lease condensate. As of Dec. 31, 1945, the reserves so included totaled 884,967,000 barrels and as of Dec. 31, 1944, there were 668,701,000 barrels included. Beginning with the report of Dec. 31, 1946, the figures in this table show crude oil and natural gas liquids. It is to be remembered that, previous to Dec. 31, 1946, not all classes of natural gas liquids were included. For this reason the totals for crude oil and natural gas liquids, as herewith recorded for 1946, 1947 and 1948, are not comparable with the figures recorded for years prior to 1946.

[2] Crude oil only.

[3] This detail not available for 1946.

TABLE H–5.—*Estimates of proved oil reserves in the United States, on Dec. 31, 1943–49, by States* [1]

[Millions of barrels]

| State | 1943 | 1944 | 1945 | 1945 [2] | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|---|---|
| Eastern States: | | | | | | | | |
| Illinois | 295 | 321 | 350 | 350 | 351 | 355 | 393 | 468 |
| Indiana | 31 | 31 | 41 | 41 | 44 | 46 | 49 | 50 |
| Kentucky | 35 | 41 | 57 | 57 | 59 | 65 | 59 | 56 |
| Michigan | 55 | 65 | 64 | 64 | 69 | 70 | 69 | 66 |
| New York | 90 | 86 | 81 | 81 | 76 | 71 | 67 | 63 |
| Ohio | 33 | 32 | 30 | 30 | 29 | 29 | 29 | 28 |
| Pennsylvania | 137 | 123 | 110 | 110 | 98 | 123 | 110 | 103 |
| West Virginia | 44 | 41 | 39 | 39 | 36 | 36 | 37 | 38 |
| Total | 720 | 740 | 772 | 772 | 762 | 795 | 813 | 872 |
| Central and Southern States: | | | | | | | | |
| Arkansas | 297 | 293 | 304 | 288 | 267 | 297 | 300 | 297 |
| Kansas | 646 | 602 | 542 | 542 | 545 | 563 | 674 | 738 |
| Louisiana | 1,484 | 1,573 | 1,690 | 1,559 | 1,652 | 1,791 | 1,869 | 1,910 |
| Mississippi | 39 | 209 | 267 | 257 | 270 | 304 | 365 | 403 |
| New Mexico | 654 | 563 | 512 | 512 | 544 | 530 | 552 | 592 |
| Oklahoma | 909 | 970 | 890 | 889 | 898 | 953 | 1,250 | 1,330 |
| Texas | 11,325 | 11,375 | 11,470 | 10,835 | 11,647 | 11,777 | 12,484 | 13,510 |
| Total | 15,354 | 15,585 | 15,675 | 14,882 | 15,823 | 16,215 | 17,494 | 18,780 |
| Mountain States: | | | | | | | | |
| Colorado | 45 | 89 | 260 | 260 | 300 | 382 | 366 | 345 |
| Montana | 108 | 112 | 108 | 108 | 104 | 115 | 119 | 112 |
| Wyoming | 499 | 582 | 600 | 600 | 589 | 679 | 716 | 692 |
| Total | 652 | 783 | 968 | 968 | 993 | 1,176 | 1,201 | 1,149 |
| Pacific Coast States: California | 3,337 | 3,344 | 3,410 | 3,318 | 3,294 | 3,295 | 3,764 | 3,823 |
| Other States | 1 | 1 | 2 | 2 | 2 | 7 | 8 | 25 |
| Total United States | 20,064 | 20,453 | 20,827 | 19,942 | 20,874 | 21,488 | 23,280 | 24,649 |

[1] From reports of Committee on Petroleum Reserves, American Petroleum Institute, of the amount of crude oil that may be extracted by present methods from fields completely developed or sufficiently explored to permit reasonably accurate calculations. The change in reserves during any year represents total new discoveries, extensions, and revisions, minus production.

[2] New basis; excludes condensate.

TABLE H–6.—*Estimates of petroleum reserves in principal producing countries* [1]

[Thousands of barrels]

| Continent and country | Estimated reserves (Jan. 1, 1950) | Percent world reserves |
|---|---|---|
| North America: | | |
| Canada | 1,200,000 | 1.53 |
| Cuba | 2,800 | .01 |
| Mexico | 850,000 | 1.09 |
| United States | 25,909,000 | 33.09 |
| Total | 27,961,800 | 35.72 |
| South America: | | |
| Argentina | 250,000 | .33 |
| Bolivia | 20,000 | .02 |
| Brazil | 20,000 | .02 |
| Chile | 10,000 | .01 |
| Colombia | 300,000 | .38 |
| Ecuador | 28,000 | .04 |
| Peru | 160,000 | .21 |
| Trinidad | 260,000 | .33 |
| Venezuela | 9,500,000 | 12.13 |
| Total | 10,548,000 | 13.47 |
| Europe (including U. S. S. R.): | | |
| Albania | 9,000 | .01 |
| Austria | 75,000 | .10 |
| Czechoslovakia | 2,000 | 0 |
| France | 4,250 | .01 |
| Germany | 150,000 | .19 |
| Hungary | 3,700 | .01 |
| Italy | 2,000 | 0 |
| Netherlands | 50,000 | .06 |
| Poland | 20,000 | .02 |
| Rumania | 350,000 | .46 |
| U. S. S. R. | 4,300,000 | 5.49 |
| Europe (including U. S. S. R.)—Continued | | |
| Yugoslavia | 4,000 | .01 |
| Total | 5,009,950 | 6.41 |
| Africa: | | |
| Algeria and Morroco | 2,500 | .01 |
| Egypt | 200,000 | .25 |
| Total | 202,500 | .26 |
| Asia: | | |
| Bahrein | 160,000 | .21 |
| British Borneo | 300,000 | .38 |
| Burma | 50,000 | .06 |
| China and Formosa | 20,000 | .02 |
| India | 35,000 | .04 |
| Iran | 7,000,000 | 8.93 |
| Iraq | 5,250,000 | 6.70 |
| Japan | 15,000 | .02 |
| Kuwait | 11,000,000 | 14.05 |
| Netherlands East Indies | 1,100,000 | 1.41 |
| New Guinea | 50,000 | .06 |
| Qatar | 500,000 | .66 |
| Sakhalin | 75,000 | .10 |
| Saudi Arabia | 9,000,000 | 11.49 |
| Turkey | 3,000 | .01 |
| Total | 34,558,000 | 44.14 |
| Total world reserves | 78,280,250 | 100.0 |

[1] Twentieth Century Petroleum Statistics. 1950. DeGolyer and McNaughton, Dallas, Tex., p. 1.
Authority: Oil and Gas Journal.

TABLE H–7.—*Crude petroleum—estimated proved reserves for world* [1]

[Thousands of barrels]

| Areas | Total reserves, Jan. 1, 1950 | Approximate percentage, American-controlled | |
|---|---|---|---|
| | | *Barrels* | *Percent* |
| North America | 27,961,800 | 26,563,710 | 95+ |
| South America | 10,548,000 | 7,805,520 | 74+ |
| Total Western Hemisphere | 38,509,800 | 34,369,230 | 89+ |
| Europe (including U. S. S. R.) | 5,009,950 | 50,100 | 1+ |
| Africa | 202,500 | 198,450 | 98+ |
| Middle East | 32,913,000 | 13,823,460 | 42+ |
| Far East | 1,645,000 | 460,600 | 28+ |
| Total Eastern Hemisphere | 39,770,450 | 14,532,610 | 36+ |
| World Total | 78,280,250 | 48,901,840 | 62+ |

[1] Twentieth Century Petroleum Statistics, 1950. De Golyer and McNaughton, Dallas, Tex., p. 2.
Authority: Oil and Gas Journal.

TABLE H–8.—*Petroleum reserves in the Middle East estimated Dec. 31, 1949*

| Country | United States interests | | His Majesty's Government interests | | Other British interests | | British-Dutch interests | | French interests | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Percent* | *Billion barrels* | *Percent* | *Billion barrels* | *Percent* | *Billion barrels* | *Percent* | *Billion barrels* | *Percent* | *Billion barrels* | |
| Iran | | | 56 | 7.28 | 44 | 5.72 | | | | | 13.00 |
| Iraq | 23.75 | 2.14 | 23.75 | 2.14 | 5 | .44 | 23.75 | 2.14 | 23.75 | 2.14 | 9.00 |
| Kuwait | 50 | 7.50 | 50 | 7.50 | | | | | | | 15.00 |
| Saudi Arabia | 100 | 11.00 | | | | | | | | | 11.00 |
| Bahrein | 100 | .50 | | | | | | | | | 50 |
| Qatar | 23.75 | .12 | 23.75 | .12 | 5 | .02 | 23.75 | .12 | 23.75 | .12 | 50 |
| Others | 50 | .10 | | | | | 50 | .10 | | | 20 |
| Total | 43.42 | 21.36 | 34.63 | 17.04 | 12.56 | 6.18 | 4.80 | 2.36 | 4.60 | 2.26 | 49.20 |

Total British and British-Dutch ..... 25.58 billion barrels (52 percent)
Total European ..... 27.84 billion barrels (56.58 percent)
Total United States ..... 21.36 billion barrels (43.42 percent)

*Natural gas*

The first attempt to estimate natural gas reserves was made in 1925. The proved recoverable reserves were estimated in that year at some 23 trillion cubic feet.[1] From that time successive estimates have been higher, until that of December 31, 1949, reached the total of over 180 trillion.

As in the case of petroleum reserves, Texas has by far the largest proportion of natural gas reserves. Of the total, Texas has 55 percent, Louisiana 15 percent, Kansas 7.8 percent, Oklahoma 6.4 percent, California 5.5 percent, New Mexico 3.4 percent, with the rest scattered (H–10).

Alaska is known to have some natural gas. There is one small gas well now producing in the Point Barrow region for consumption at Camp Barrow on the Arctic coast. It is probable that others could be drilled elsewhere on the north slope which would be of commercial importance were they located closer to consuming centers. No estimates have been made of natural gas reserves in Alaska.

[1] Gas Facts, 1949, American Gas Association, p. 22.

TABLE H–9.—*Summary of annual estimates of natural gas reserves 1945–49*

[Millions of cubic feet]

| Year | Natural gas added during year | | | Net change in underground storage | Net production during year | Estimated proved reserves as of end of year | Increase over previous year |
|---|---|---|---|---|---|---|---|
| | Extensions and revisions | Discoveries of new fields and new pools in old fields | Total of discoveries, revisions, and extensions | | | | |
| 1945 | | | | | | 147, 789, 367 | |
| 1946 | (1) | (1) | 17, 729, 152 | (1) | 4, 942, 617 | 160, 575, 901 | 12, 786, 535 |
| 1947 | 7, 570, 654 | 3, 410, 170 | 10, 980, 824 | (1) | 5, 629, 811 | 165, 926, 914 | 5, 351, 013 |
| 1948 | 9, 769, 483 | 4, 129, 089 | 13, 898, 572 | 51, 482 | 6, 007, 628 | 173, 869, 340 | 7, 942, 426 |
| 1949 | 8, 061, 429 | 4, 612, 870 | 12, 674, 299 | 82, 746 | 6, 245, 041 | 180, 381, 344 | 6, 512, 004 |

[1] Not estimated separately.

NOTE.—Volumes are calculated at a pressure base of 14.65 pounds per square inch, absolute, and at a standard temperature of 60° F.

Source: AGA Committee on Natural Gas Reserves.

TABLE H–10.—*Estimated proved recoverable reserves of natural gas, by State, 1948–49*

[Millions of cubic feet]

| State | Dec. 31, 1948 | Dec. 31, 1949 | | | | |
|---|---|---|---|---|---|---|
| | | Total | Nonassociated | Associated | Dissolved | Underground storage |
| United States | 173, 869, 340 | 180, 381, 344 | 126, 117, 504 | 27, 588, 672 | 26, 386, 698 | 288, 470 |
| Arkansas | 901, 838 | 874, 190 | 438, 861 | 161, 224 | 272, 645 | 1, 460 |
| California | 10, 192, 593 | 9, 991, 635 | 2, 773, 105 | 2, 357, 637 | 4, 845, 763 | 15, 130 |
| Colorado | 1, 349, 179 | 1, 227, 095 | 580, 442 | 33, 603 | 613, 050 | 0 |
| Illinois | 227, 804 | 233, 192 | 5, 692 | 15, 000 | 212, 500 | 0 |
| Indiana | 21, 600 | 25, 200 | 5, 000 | 0 | 20, 200 | 0 |
| Kansas | 14, 407, 832 | 14, 089, 560 | 13, 702, 217 | 127, 988 | 230, 206 | 29, 149 |
| Kentucky | 1, 378, 151 | 1, 349, 397 | 1, 270, 903 | 0 | 66, 000 | 12, 494 |
| Louisiana | 23, 977, 520 | 26, 687, 811 | 20, 954, 929 | 4, 135, 685 | 1, 597, 197 | 0 |
| Michigan | 182, 987 | 214, 911 | 145, 642 | 0 | 47, 495 | 21, 774 |
| Mississippi | 2, 504, 336 | 2, 528, 969 | 1, 764, 540 | 415, 030 | 349, 399 | 0 |
| Montana | 852, 605 | 803, 471 | 767, 051 | 6, 088 | 27, 341 | 2, 991 |
| New Mexico | 5, 606, 361 | 6, 241, 003 | 3, 137, 497 | 2, 252, 569 | 839, 734 | 11, 203 |
| New York | 67, 615 | 66, 685 | 56, 310 | 0 | 660 | 9, 715 |
| Ohio | 629, 453 | 652, 571 | 549, 097 | 0 | 36, 500 | 66, 974 |
| Oklahoma | 11, 332, 445 | 11, 625, 979 | 7, 873, 220 | 969, 132 | 2, 767, 508 | 16, 119 |
| Pennsylvania | 617, 410 | 621, 680 | 520, 069 | 0 | 43, 250 | 58, 361 |
| Texas | 95, 708, 553 | 99, 170, 403 | 68, 579, 797 | 16, 959, 726 | 13, 630, 880 | 0 |
| Utah | 69, 798 | 65, 577 | 65, 269 | 0 | 308 | 0 |
| West Virginia | 1, 737, 167 | 1, 715, 233 | 1, 587, 107 | 0 | 85, 500 | 42, 626 |
| Wyoming | 2, 093, 740 | 2, 173, 677 | 1, 328, 615 | 148, 290 | 696, 298 | 474 |
| Miscellaneous [1] | 10, 353 | 23, 105 | 12, 141 | 6, 700 | 4, 264 | 0 |

[1] Includes Alabama, Florida, Maryland, Missouri, Nebraska and Virginia.

NOTE.—Volumes are calculated at a pressure base of 14.65 pounds per square inch absolute, and at a standard temperature of 60° F. Reserves of dissolved gas were estimated jointly with the API Committee on Petroleum Reserves. Shrinkage caused by natural gas liquids recovery excluded.

Source: American Gas Association, Gas Facts, 1949.

*Coal*

Coal is America's most plentiful source of mineral energy according to current estimates of reserves. Original reserves have been estimated for all ranks as of January 1, 1950, at almost 2½ trillion short tons. Of this amount, a little more than half is designated as bituminous (1.3 trillion) about 19 percent or about 500 billions is of subbituminous rank; over 700 billion tons is lignite, and less than 1 percent or about 24 billion tons is anthracite.

Totals for each rank, by States, are noted in table H–11 for estimated original reserves, production and losses in mining, remaining reserves and recoverable reserves as of January 1, 1950.

Estimates of the amount and extent of United States coal reserves are the result of considerable volume of information of varying degrees of accuracy. Much has been inferred from geologists' observations of surface out-croppings, exploratory tunnels, shafts, and core drilling taken from coal seams. Some has been incidental, as that resulting from drilling for petroleum, natural gas, and water, and while exploring for other minerals. Some has been accidental, such as observation of cuts made in the earth's surface by rivers and natural causes such as landslides, building of highways and railways.

The formerly held view that coal reserves are almost limitless is rapidly giving way to a more realistic estimate of what these reserves are most likely to be. Even with present programs of reserves evaluation, based on scientific measurement of coal seams and their extent, much of the estimate is inferred from inadequate, outdated geological information and may actually be much less. For example, it has been assumed that the Pittsburgh coal bed is of uniform depth and thickness throughout the area it is known to exist, hundreds of square miles of Ohio, Pennsylvania, Maryland, West Virginia. However, exploratory drillings in recent years have shown that while it is generally continuous it may be very thin or even absent locally.

Much coal that will probably never be mined is also included in estimates of the original reserves such as thin deeply buried beds that may be so expensive to mine as to eliminate them from practical consideration.

TABLE H–11.—*Coal reserves of the United States, Jan. 1, 1950, by rank (reserves depleted to Jan. 1, 1950)*

[In thousands of short tons]

BITUMINOUS COAL

| State | Estimated original reserves | Produced to Jan. 1, 1950 [1] | Produced and lost in mining, assuming past losses equal production | Remaining reserves Jan. 1, 1950 | Recoverable reserves Jan. 1, 1950, assuming 50 percent recovery |
|---|---|---|---|---|---|
| Alabama | 67,570,000 | 821,590 | 1,643,180 | 65,926,820 | 32,963,410 |
| Arkansas | 1,396,000 | 82,785 | 165,570 | 1,230,430 | 615,215 |
| Colorado | 213,071,000 | 357,719 | 715,438 | 212,355,562 | 106,177,781 |
| Georgia | 933,000 | 11,533 | 23,066 | 909,934 | 454,967 |
| Illinois | 171,905,000 | 3,131,997 | 6,263,994 | 165,641 006 | 82,820,503 |
| Indiana | 53,051,000 | 984,137 | 1,968,274 | 51,082,726 | 25,541,363 |
| Iowa | 29,160,000 | 343,162 | 686,324 | 28,473,676 | 14,236,838 |
| Kansas | [2] 17,574,000 | [3] 9,800 | [3] 19,600 | 17,554,400 | 8,777,200 |
| Kentucky | 123,327,000 | 1,951,803 | 3,903,606 | 119,423,394 | 59,711,697 |
| Maryland | 8,043,000 | 259,943 | 519,886 | 7,523,114 | 3,761,557 |
| Michigan | 296,900 | [4] 46,240 | [3] 77,000 | 219,900 | 109,950 |
| Missouri | 79,362,016 | 257,787 | 515,574 | 78,846,442 | 39,423,221 |
| Montana | 2,362,610 | 31,491 | 62,982 | 2,299,628 | 1,149,814 |
| New Mexico | 10,947,700 | 88,189 | 176,378 | 10,771,322 | 5,385,661 |
| North Carolina | 110,462 | 1,054 | 2,108 | 108,354 | 54,177 |
| Ohio | 86,497,000 | 1,694,259 | 3,388,518 | 83,108,482 | 41,554,241 |
| Oklahoma | 54,951,000 | 158,846 | 317,692 | 54,633,308 | 27,316,654 |
| Pennsylvania | 75,093,459 | 7,416,956 | 14,833,912 | 60,259,547 | 30,129,774 |
| Tennessee | 25,665,000 | 324,718 | 649,436 | 25,015,564 | 12,507,782 |
| Texas | 8,000,000 | 10,706 | 21,412 | 7,978,588 | 3,989,294 |
| Utah | 88,184,000 | 195,833 | 391,666 | 87,792,334 | 43,896,167 |
| Virginia | 21,149,000 | 538,887 | 1,077,774 | 20,071,226 | 10,035,613 |
| Washington | 11,413,000 | 123,804 | 247,608 | 11,165,392 | 5,582,696 |
| West Virginia | 116,618,447 | 4,979,385 | 9,958,770 | 106,659,677 | 53,329,838 |
| Wyoming | 13,234,950 | 230,272 | 460,544 | 12,774,406 | 6,387,203 |
| Other States [6] | 820,000 | 4,956 | 9,912 | 810,088 | 405,044 |
| Total | 1,280,735,544 | 24,057,852 | 48,100,224 | 1,232,635,320 | 616,317,660 |

SUBBITUMINOUS COAL

| | | | | | |
|---|---|---|---|---|---|
| Colorado | 104,175,000 | 107,506 | 215,012 | 103,959,988 | 51,979,994 |
| Montana | 132,151,060 | 124,544 | 249,088 | 131,901,972 | 65,950,986 |
| New Mexico | 50,801,200 | 32,226 | 64,452 | 50,736,748 | 25,368,374 |
| Utah | 5,156,000 | 2,832 | 5,664 | 5,150,336 | 2,575,168 |
| Washington | 52,442,000 | 19,100 | 38,200 | 52,403,800 | 26,201,900 |
| Wyoming [8] | 108,318,900 | 132,103 | 264,206 | 108,054,694 | 54,027,347 |
| Other States [7] | 15,500,000 | 3,832 | 7,664 | 15,492,336 | 7,746,168 |
| Total | 468,544,160 | 422,143 | 844,286 | 467,699,874 | 233,849,937 |

See footnotes at end of table, p. 155.

TABLE H–11.—*Coal reserves of the United States, Jan. 1, 1950, by rank (reserves depleted to Jan. 1, 1950)*—Continued

[In thousands of short tons]

LIGNITE

| State | Estimated original reserves | Produced to Jan. 1, 1950 [1] | Produced and lost in mining, assuming past losses equal production | Remaining reserves Jan. 1, 1950 | Recoverable reserves Jan. 1, 1950, assuming 50 percent recovery |
|---|---|---|---|---|---|
| Arkansas | 90,000 | 0 | 0 | 90,000 | 45,000 |
| Montana | 87,533,270 | 1,213 | 2,426 | 87,530,844 | 43,765,422 |
| North Dakota | 600,000,000 | 67,856 | 135,712 | 599,864,288 | 299,932,144 |
| South Dakota | 1,020,000 | 921 | 1,842 | 1,018,158 | 509,079 |
| Texas | 23,000,000 | 51,341 | 102,682 | 22,897,318 | 11,448,659 |
| Wyoming [8] | | | | | |
| Other States [9] | 49,963 | 1 | 2 | 49,961 | 24,981 |
| Total | 711,693,233 | 121,332 | 242,664 | 711,450,569 | 355,725,285 |

ANTHRACITE AND SEMIANTHRACITE

| | | | | | |
|---|---|---|---|---|---|
| Arkansas | 230,000 | 9,109 | 18,218 | 211,782 | 105,891 |
| Colorado | 100,000 | 5,921 | 11,842 | 88,158 | 44,079 |
| New Mexico | 5,700 | 1,092 | 2,184 | 3,516 | 1,758 |
| Pennsylvania | 22,805,000 | 4,916,006 | 9,832,012 | 12,972,988 | 6,486,494 |
| Virginia | 500,000 | 9,592 | 19,184 | 480,816 | 240,408 |
| Washington | 23,000 | 0 | 0 | 23,000 | 11,500 |
| Total | 23,663,700 | 4,941,720 | 9,883,440 | 13,780,260 | 6,890,130 |
| Total, all ranks of coal | 2,484,636,637 | 29,543,047 | 59,070,614 | 2,425,566,023 | 1,212,783,012 |

[1] Production, 1800 through 1885, from The First Century and a Quarter of American Coal Industry, by H. N. Eavenson, privately printed, Pittsburgh, 1942; production, 1886 through 1949, from U. S. Bureau of Mines Minerals Yearbooks, unless otherwise indicated.
[2] Remaining reserves, Jan. 1, 1946.
[3] Production, Jan. 1, 1946, to Jan. 1, 1950.
[4] Michigan Geological Survey Division, as cited in U. S. Geological Survey Circular 77, p. 56, 1950.
[5] Past losses assumed to be 40 percent of coal originally in the ground.
[6] Includes Arizona, California, Idaho, and Oregon.
[7] Includes Arizona, California, and Oregon.
[8] Small reserves and production of lignite included under subbituminous coal.
[9] Includes California and Louisiana.

Source: Geological Survey, U. S. Department of the Interior, Circular 94. Coal Resources of the United States, a progress report, Nov. 1, 1950, by Paul Averitt and Louisa R. Berryhill.

Total remaining reserves of coal by States for all ranks, estimated January 1, 1950, reveal that North Dakota has by far the largest amount. This is due to the huge deposits of lignite, estimated at 600,000,000,000 tons. Colorado has the largest amount of bituminous coal, over 212,000,000,000 short tons. Next in rank are: Illinois with 165,000,000,000 tons; Kentucky, with 119,000,000,000 tons; and West Virginia, with nearly 107,000,000,000 tons, with the rest having lesser amounts.

Subbituminous coal reserves remaining as estimated January 1, 1950, are largely concentrated in the Rocky Mountain States of Colorado, Montana, and Wyoming.

Lignite is found in only eight States. North Dakota, as noted above, accounts for most of the reserves of this rank. Some is found in the adjoining States of Montana and South Dakota. A small amount is located in a belt crossing eastern Texas, extending north and east through Arkansas, Louisiana, and Alabama.

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TABLE H–12.—*Coal reserves of the United States, Jan. 1, 1950, by States*

[In thousands of short tons]

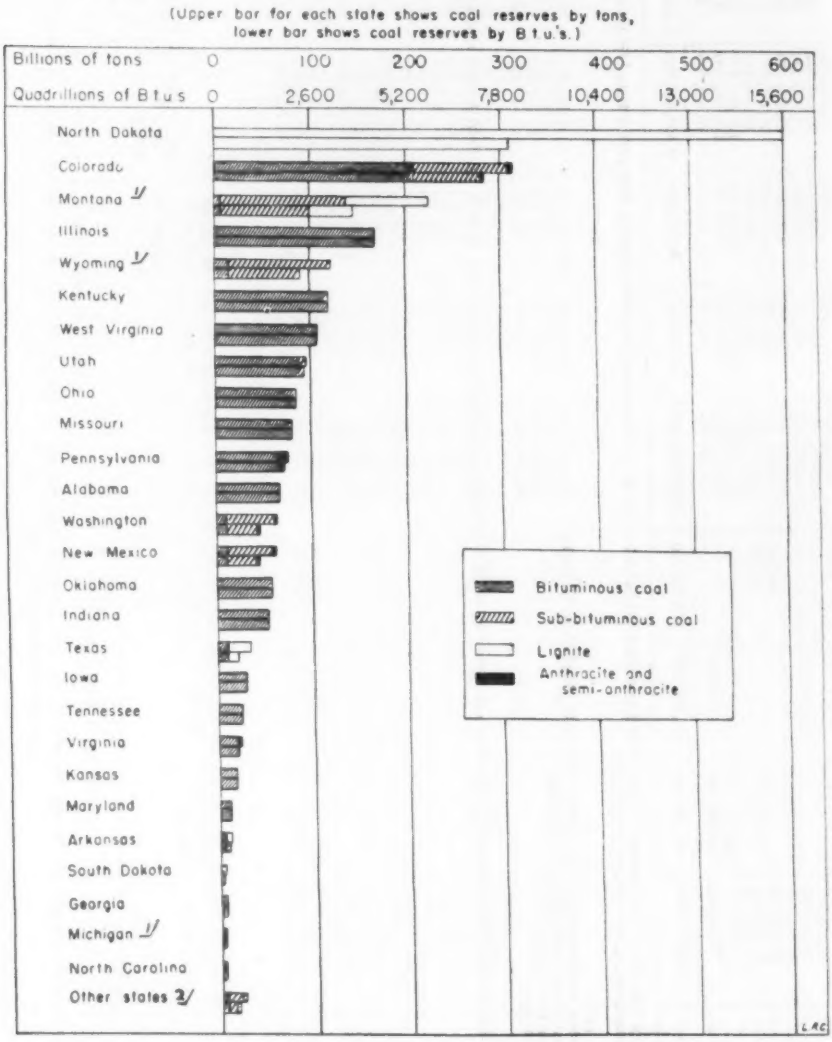
| State | Estimated original reserves | | | | | Reserves depleted to Jan. 1, 1950 | | Remaining reserves Jan. 1, 1950 | Recoverable reserves Jan. 1, 1950, assuming 50 percent recovery |
|---|---|---|---|---|---|---|---|---|---|
| | Bituminous coal | Subbituminous coal | Lignite | Anthracite | Total | Produced [1] | Produced and lost in mining assuming past losses equal production | | |
| Alabama | 67,570,000 | | | | 67,570,000 | 821,590 | 1,643,180 | 65,926,820 | 32,963,410 |
| Arkansas | 1,396,000 | | 90,000 | 230,000 | 1,716,000 | 91,894 | 183,788 | 1,532,212 | 766,106 |
| Colorado | 213,071,000 | 104,175,000 | | 100,000 | 317,346,000 | 471,146 | 942,292 | 316,403,708 | 158,201,854 |
| Georgia | 933,000 | | | | 933,000 | 11,533 | 23,066 | 909,934 | 454,967 |
| Illinois | 171,905,000 | | | | 171,905,000 | 3,131,997 | 6,263,994 | 165,641,006 | 82,820,503 |
| Indiana | 53,051,000 | | | | 53,051,000 | 984,137 | 1,968,274 | 51,082,726 | 25,541,363 |
| Iowa | 29,160,000 | | | | 29,160,000 | 343,162 | 686,324 | 28,473,676 | 14,236,838 |
| Kansas | [2] 17,574,000 | | | | [2] 17,574,000 | [3] 9,800 | [3] 19,600 | 17,554,400 | 8,777,200 |
| Kentucky | 123,327,000 | | | | 123,327,000 | 1,951,803 | 3,903,606 | 119,423,394 | 59,711,697 |
| Maryland | 8,043,000 | | | | 8,043,000 | 259,943 | 519,886 | 7,523,114 | 3,761,557 |
| Michigan | 296,900 | | | | 296,900 | [4] 46,240 | [5] 77,000 | 219,900 | 109,950 |
| Missouri | 79,362,016 | | | | 79,362,016 | 257,787 | 515,574 | 78,846,442 | 39,423,221 |
| Montana | 2,362,610 | 132,151,060 | 87,533,270 | | 222,046,940 | 157,248 | 314,496 | 221,732,444 | 110,866,222 |
| New Mexico | 10,947,700 | 50,801,200 | | 5,700 | 61,754,600 | 121,507 | 243,014 | 61,511,586 | 30,755,793 |
| North Carolina | 110,462 | | | | 110,462 | 1,054 | 2,108 | 108,354 | 54,177 |
| North Dakota | | | 600,000,000 | | 600,000,000 | 67,856 | 135,712 | 599,864,288 | 299,932,144 |
| Ohio | 86,497,000 | | | | 86,497,000 | 1,694,259 | 3,388,518 | 83,108,482 | 41,554,241 |
| Oklahoma | 54,951,000 | | | | 54,951,000 | 158,846 | 317,692 | 54,633,308 | 27,316,654 |
| Pennsylvania | 75,093,459 | | | 22,805,000 | 97,898,459 | 12,332,962 | 24,665,924 | 73,232,535 | 36,616,268 |
| South Dakota | | | 1,020,000 | | 1,020,000 | 921 | 1,842 | 1,018,158 | 509,079 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| South Dakota | | | 1, 020, 000 | | 1, 020, 000 | 921 | 1, 842 | 1, 018, 158 | 509, 079 |
| Tennessee | 25, 665, 000 | | | | 25, 665, 000 | 324, 718 | 649, 436 | 25, 015, 564 | 12, 507, 782 |
| Texas | 8, 000, 000 | | 23, 000, 000 | | 31, 000, 000 | 62, 047 | 124, 094 | 30, 875, 906 | 15, 437, 953 |
| Utah | 88, 184, 000 | 5, 156, 000 | | | 93, 340, 000 | 198, 665 | 397, 330 | 92, 942, 670 | 46, 471, 335 |
| Virginia | 21, 149, 000 | | | 500, 000 | 21, 649, 000 | 548, 479 | 1, 096, 958 | 20, 552, 042 | 10, 276, 021 |
| Washington | 11, 413, 000 | 52, 442, 000 | | 23, 000 | 63, 878, 000 | 142, 904 | 285, 808 | 63, 592, 192 | 31, 796, 096 |
| West Virginia | 116, 618, 447 | | | | 116, 618, 447 | 4, 979, 385 | 9, 958, 770 | 106, 659, 677 | 53, 329, 838 |
| Wyoming | 13, 234, 950 | 108, 318, 900 | | | 121, 553, 850 | 362, 375 | 724, 750 | 120, 829, 100 | 60, 414, 550 |
| Other States | [6] 820, 000 | [7] 15, 500, 000 | [8] 49, 963 | | 16, 369, 963 | 8, 789 | 17, 578 | 16, 352, 385 | 8, 176, 193 |
| Total | 1, 280, 735, 544 | 468, 544, 160 | 711, 693, 233 | 23, 663, 700 | 2, 484, 636, 637 | 29, 543, 047 | 59, 070, 614 | 2, 425, 566, 023 | 1, 212, 783, 012 |

[1] Production, 1800 through 1885, from The First Century and a Quarter of American Coal Industry, by H. N. Eavenson, privately printed, 1942; production, 1886 through 1949 from U. S. Bureau of Mines Minerals yearbooks, unless otherwise indicated.
[2] Remaining reserves, Jan. 1, 1946.
[3] Production, Jan. 1, 1946, to Jan. 1, 1950.
[4] Michigan Geological Survey Division, as cited in U. S. Geological Survey Circular 77, p. 56, 1950.
[5] Past losses assumed to be 40 percent of coal originally in the ground.
[6] Includes Arizona, California, Idaho, and Oregon.
[7] Includes Arizona, California, and Oregon.
[8] Includes California and Louisiana.

Source: Geological Survey, U. S. Department of the Interior, Circular 94, Coal Resources of the United States: a progress report, Nov. 1, 1950, by Paul Averitt and Louise R. Berryhill.

FIGURE H–1.—REMAINING COAL RESERVES OF THE UNITED STATES, JANUARY 1, 1950, BY STATES, ACCORDING TO TONNAGE AND HEAT VALUE.




1 Data from 1950 revised estimates.
2 Includes Arizona, California, Idaho, Louisiana, and Oregon.

Source: U. S. Geological Survey.
NOTE.—Wyoming, Montana, Michigan, New Mexico, and North Carolina on new basis; not comparable.

Estimates of original coal reserves for Alaska, made in 1944–45 are 107,000,000,000 tons for all ranks.

Of the total estimated original coal reserves of Alaska, slightly under 3,000,000,000 short tons, or less than 3 percent, are accessible by present means of transportation: 84 percent of these reserves is of subbituminous and lignite ranks located in the Pacific Ocean drainage area and on the Alaska Peninsula. In the Arctic Ocean drainage area there are an estimated 22,000,000,000 tons of bituminous rank coals, but remote from present means of transportation. This represents over 92 percent of all the reserves of that rank in Alaska. Nearly three-fourths of Alaska's original reserves of subbituminous and lignite is also located in remote Arctic Ocean drainage areas.

It is clear that development of Alaskan coal resources, including the 1,000,000,000 tons of anthracite in the Pacific drainage and peninsula areas within 40 miles of transportation, await transportation facilities or development of mining technique under Arctic conditions.

Despite the seemingly plentiful supplies of coal, some shortages of certain specialized types have developed. Among the most important is that of coal for use in making metallurgical coke. Reserves of the best type for this purpose—low- and medium-volatile bituminous rank with low ash and sulfur content—are small and are being rapidly depleted.

The reserves of metallurgical coal are mostly in the East, principally in West Virginia, Pennsylvania, Kentucky, and Virginia.

In a few areas in the West, principally Colorado, Utah, New Mexico, Oklahoma, and Arkansas coal is produced that is satisfactory for coke when used.

TABLE H–13.—*Original low-volatile bituminous coal reserves*

| State | Reserves (in thousands of short tons) | Percent of total reserves in State | Percent of total United States reserves |
|---|---|---|---|
| West Virginia | 10,251,139 | 8.8 | |
| Pennsylvania | 5,672,905 | 5.8 | |
| Maryland | 4,021,500 | 50.0 | |
| Oklahoma | 2,000,000 | 3.6 | |
| Arkansas | 1,226,000 | 71.5 | |
| Virginia | 400,000 | 1.8 | |
| Other States | 934,000 | | |
| Total | 24,505,544 | | 1.0 |

Source: Geological Survey, Circular 94, 1950.

There are other blends of coals that can be used for the manufacture of coke, and blends of coal with noncoking ingredients such as anthracite fines, petroleum coke, or low-temperature char.

TABLE H–14.—*Estimated original coal reserves of the world by continents and principal coal-producing countries*

| | Original reserves (in thousands of metric tons) | Percent of continent total | Percent of world total |
|---|---|---|---|
| North America: | | | |
| United States [1] | 2,254,027,000 | 92.3 | 39.9 |
| Alaska [2] | 97,426,000 | 4.0 | 1.7 |
| Canada | 89,644,000 | 3.7 | 1.6 |
| Total | 2,441,097,000 | 100.0 | 43.2 |
| Asia: | | | |
| U. S. S. R. [3] | 1,200,000,000 | 52.2 | 21.2 |
| China | 1,011,000,000 | 44.0 | 17.9 |
| India | 62,143,000 | 2.7 | 1.1 |
| Japan | 16,218,000 | .74 | .28 |
| Others [4] | 7,563,000 | .36 | .12 |
| Total | 2,296,924,000 | 100.00 | 40.60 |
| Europe: | | | |
| Germany | 336,274,000 | 51.8 | 5.9 |
| United Kingdom | 172,200,000 | 26.5 | 3.1 |
| Poland | 80,018,000 | 12.3 | 1.4 |
| Czechoslovakia | 18,950,000 | 2.9 | .35 |
| Portugal | 10,236,000 | 1.6 | .19 |
| Others [5] | 31,134,000 | 4.9 | .56 |
| Total | 648,812,000 | 100.0 | 11.50 |
| Africa: | | | |
| Union of South Africa | 205,395,000 | 99.06 | 3.66 |
| Others [6] | 1,930,000 | .94 | .04 |
| Total | 207,325,000 | 100.00 | 3.70 |
| Australasia: | | | |
| Australia | 53,100,000 | 99.0 | .92 |
| Others [7] | 546,000 | 1.0 | .01 |
| Total | 53,646,000 | 100.0 | .93 |
| South America: | | | |
| Chile | 2,116,000 | 51.4 | .036 |
| Others [8] | 2,000,000 | 48.6 | .034 |
| Total | 4,116,000 | 100.0 | .07 |
| World total | 5,651,920,000 | ---------- | 100.00 |

[1] Estimate of original reserves as shown in tables H–11 and H–12, converted to metric tons.
[2] Estimate of original reserves converted to metric tons.
[3] Total for European Russia included with Asiatic Russia.
[4] Includes Korea, Malaya, Manchuria, and Turkey.
[5] Includes Austria, France, Belgium, Bulgaria, Denmark, Greece, Hungary, Italy, the Netherlands, Norway, Rumania, Sweden, and Yugoslavia.
[6] Includes Algeria, Belgian Congo, French Morocco, Madagascar, Nigeria, and Tanganyika.
[7] Includes New Zealand and New Caledonia.
[8] Includes Peru, Honduras, Colombia, and Brazil.

Source: Geological Survey, Circular 94, 1950.

FIGURE H–2.

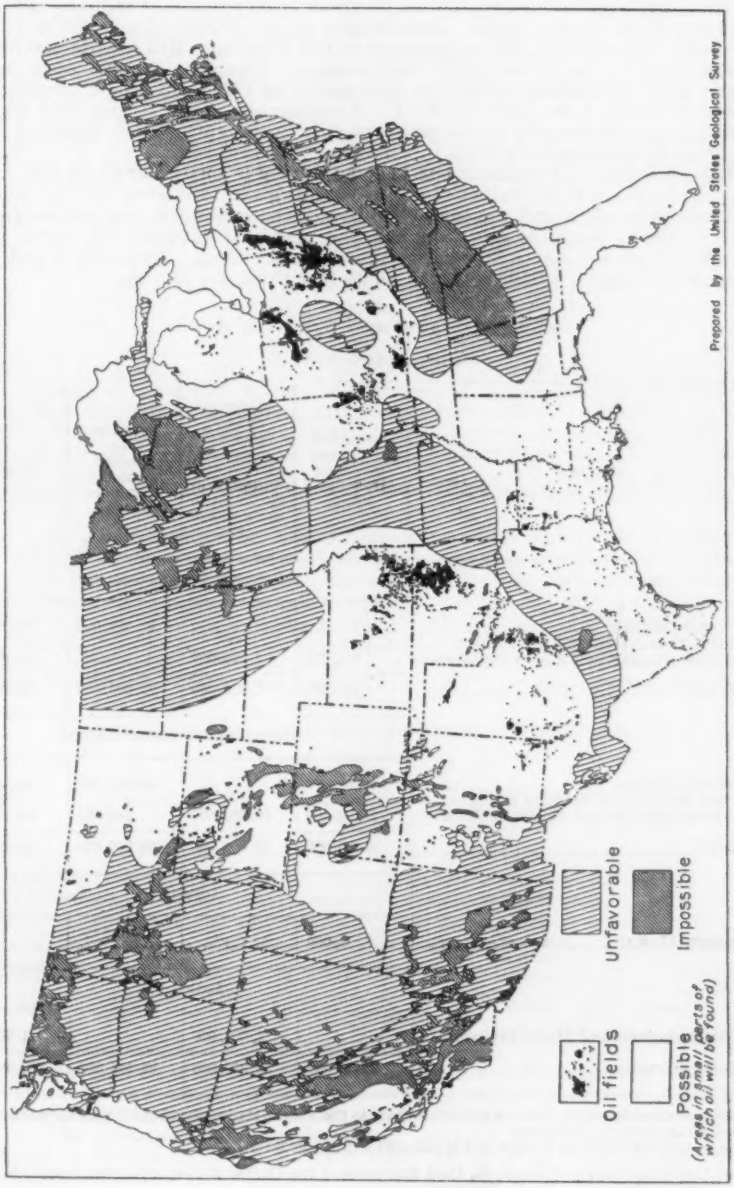



FIGURE H–2.

MAP OF THE UNITED STATES SHOWING DISTRIBUTION OF OIL FIELDS AND UNPRODUCTIVE AREAS CLASSIFIED WITH RESPECT TO THEIR RELATIVE LIKELIHOOD OF YIELDING COMMERCIAL QUANTITIES OF OIL

## Coal Reserves of Alaska [1]

No significant modification in the attached figures, which were prepared by C. Wahrhaftig in 1944–45, is required at present.

Coal investigations since that time in Alaska have been largely oriented toward more detailed understanding of the Nenana, Matanuska, and Homer fields. Specific changes in the reserve figures for these fields would not radically alter the composite figure in the table. Reestimates of the Matanuska reserves will be made when the current drilling program in the Wishbone Hill area is completed, probably at the end of the 1951 field season. Likewise, current work in the Nenana area, to be completed in the field season of 1951, will permit considerable revision of reserves for that coal field. A reestimate of the Homer field may be justified when the results of the past season's investigations are received, or at least after another season's work in this Kenai lowland area.

Some additional information has become available on the coals in the Arctic Ocean drainage, as a byproduct of oil investigations in that area, but the priority for oil resources data and the inaccessibility of the coal fields has not warranted special effort to assemble and integrate the new coal data for the Arctic area. Coal reserves on the North Slope are unquestionably large. Most of the coal is of subbituminous rank. Beds as much as 20 feet thick are known.

*Estimated original coal reserves of Alaska*

[In thousands of short tons]

| Region | Accessible by present means of transportation | Within 40 miles of present means of transportation, but not immediately available | Remote from present means of transportation | Total |
|---|---|---|---|---|
| | Bituminous coal | | | |
| Arctic Ocean drainage | | | 22,000,000 | 22,000,000 |
| Yukon and Kuskokwim drainage basins [2] | | (3) | | |
| Pacific Ocean drainage and Alaska Peninsula [3] | 450,000 | 1,350,000 | | 1,800,000 |
| Total | 450,000 | 1,350,000 | 22,000,000 | 23,800,000 |
| | Subbituminous coal and lignite | | | |
| Arctic Ocean drainage | | | 60,000,000 | 60,000,000 |
| Yukon and Kuskokwim drainage basins [2] | | 400,000 | | 400,000 |
| Pacific Ocean drainage and Alaska Peninsula [3] | 2,400,000 | 19,600,000 | 186,000 | 22,186,000 |
| Total | 2,400,000 | 20,000,000 | 60,186,000 | 82,586,000 |
| | Lignite | | | |
| Southeastern Alaska | 8,000 | | | 8,000 |
| | Anthracite | | | |
| Pacific Ocean drainage and Alaska Peninsula [3] | | 1,000,000 | | 1,000,000 |
| Total, all ranks | 2,858,000 | 22,350,000 | 82,186,000 | 107,394,000 |

[1] Excludes areas south of the Tanana River tributary to the Alaska Railroad and the Richardson Highway.
[2] Present, but quantity unknown.
[3] Includes areas excluded in Yukon and Kuskokwim drainage basins.

Source: Geological Survey Circular 94, Coal Resources of the United States, a progress report, Nov. 1, 1950, by Paul Averitt and Louise R. Berryhill.

[1] Statement by P. L. Killeen, Uniten States Geological Survey.

## Coking Coal Reserves[1]

Coke is a manufactured product, and in spite of the frequent use of the term "coking coal," there is actually little coal that can be used alone to produce coke satisfactory for metallurgical processes. Coal of medium-volatile bituminous rank is best for use in coke production, but reserves of coal of this rank are small and are rapidly being depleted. Coke that is equally satisfactory, however, can often be produced by blending together two different ranks of coal. Generally, 15 to 30 percent low-volatile coal is used in a blend with high-volatile coal that alone produces only an inferior coke. Poorly coking coal is sometimes improved by blending with such noncoking ingredients as anthracite fines, petroleum coke, or low-temperature char.

In addition to rank, the basic plant constituents of a coal also seem to be important in determining the suitability of a coal for manufacturing coke, and such deleterious constituents as ash and sulfur must not be present in excessive quantities.

Most of the reserves of high-rank and high-quality coal best suited for coke production are found in the East, principally in West Virginia, Pennsylvania, Kentucky, and Virginia. In a few areas in the West, principally in Colorado, Utah, New Mexico, Oklahoma, and Arkansas, coal is produced that is satisfactory for the manufacture of coke when used in blends. Reserves of such coal in the West have been described in a previous report.[2]

Because of the almost limitless possibilities of blending coals and other hydrocarbons in the manufacture of coke, and because of the certainty that the acceptable amounts of impurities in coke will be allowed to increase, and coking properties to decrease as the higher-rank and higher-grade coals are depleted, it is impossible to define coking coal in precise terms. It may be possible, however, to establish certain categories of coal according to coking properties, grade, and sulfur content, conforming to coal now regarded as being acceptable for use in making coke, and to report coal reserves in these categories, but this has not as yet been done.

As low-volatile bituminous coal is a blending agent which makes possible the use of vastly larger reserves of high-volatile bituminous coal for coke production, the reserves of low-volatile coal are important to consider in regard to present and future supplies of coking coal. The original reserves of low-volatile bituminous coal in the United States are shown in the following table, as estimated on the basis of information prepared by the Pennsylvania and West Virginia Geological Surveys, and information presented by M. R. Campbell in a United States Geological Survey press release on the coal resources of the United States printed in 1928.

*Original low-volatile bituminous coal reserves of the United States*

| State | Reserves (in thousands of short tons) | Percent of total reserves in State | Percent of total United States reserves |
|---|---|---|---|
| West Virginia | 10,251,139 | 8.8 | |
| Pennsylvania | 5,672,905 | 5.8 | |
| Maryland | 4,021,500 | 50.0 | |
| Oklahoma | 2,000,000 | 3.6 | |
| Arkansas | 1,226,000 | 71.5 | |
| Virginia | 400,000 | 1.8 | |
| Other States | 934,000 | | |
| Total | 24,505,544 | | 1.0 |

The total coal reserves of some of the States shown in the above table may no doubt be reduced by detailed mapping and more restricted methods of calculating reserves, and the reserves of low-volatile bituminous coal will be lowered accordingly. The proportion of low-volatile coal reserves to total coal reserves can be expected to remain approximately the same, however, as both the figures in the above table and the figures for total reserves in tables H–11 and 12 were obtained by the same methods. The value of the table lies not in the figures cited, but in the percentage of total reserves that the figures represent.

[1] From United States Department of Interior, Geological Survey, Coal Resources of the United States, a progress report, November 1, 1950, by Paul Averitt and Louise R. Berryhill. Circular 94, 1950.

[2] Berryhill, L. R., and Averitt, Paul, Coking Coal Deposits of the Western United States: U. S. Geological Survey Circular 90. In preparation.

On a tonnage basis the original reserves of low-volatile bituminous coal represent 1.0 percent of the total original reserves of coal of all ranks in the United States. Mining has been carried on extensively in the areas containing low-volatile coal, however, because of the desirable qualities of this rank of coal. As a semismokeless fuel with a high heat value, it has many uses in addition to the production of coke. In 1947, for example, 84,000,000 tons of low-volatile coal were mined, of which only about 25 percent was used in manufacturing coke.[1]

In many areas of less desirable and less readily accessible coal in the United States, the remaining reserves are very nearly equal to the original reserves because little mining has been done. The areas of low-volatile coal, on the other hand, are rapidly being exhausted, and the remaining reserves of this coal must now be less than 1 percent of the total coal remaining in the United States, of which no more than half can be regarded as recoverable. With a more or less limited supply of low volatile coal available, it is apparent that coking operations and metallurgical processes must soon be adjusted to permit increasing use of the lower ranks coal, of which larger reserves still remain.

## Reserve Estimates

Estimates of coal reserves cannot readily be compared with estimates of petroleum and natural gas reserves, because the differences in the mode of occurrence of these fuels necessitate different methods of calculating reserves. Coal occurs in stratified deposits in sedimentary rocks, and the beds maintain a fairly uniform thickness over relatively large areas. From geologic observations made at the outcrops of coal beds, in mines and prospect pits, and from evidence supplied by drilling operations, the total quantity of coal in the ground can be estimated with reasonable accuracy. In the same way, estimates of total reserves of bituminous sandstone and oil shale can be obtained because these substances also occur in stratified deposits of measurable thickness and lateral extent.

Liquid petroleum and natural gas, on the other hand, are mobile substances that move through minute openings in the rocks, and accumulate only where geologic relations provide traps that prevent further migration. As a great variety of structural and stratigraphic relations create such traps, the total number of them existing in the widespread thick sequences of sedimentary rocks cannot be predicted accurately, nor can the ultimate amount of recoverable oil or gas contained in these traps be ascertained. Only proved reserves, or reserves in developed areas, can be estimated with any certainty for petroleum and natural gas, and, consequently, the estimates must be changed annually to accord with new discoveries and with production.

Although recognizing the difficulty of comparing reserve estimates for various types of mineral fuels, it is considered desirable, nevertheless, to indicate the relation of coal reserves to the total mineral-fuel reserves of the United States. In order to show reserves of the several different fuels on as nearly similar bases as possible, two separate tables (tables H–15 and H–16) are presented, each representing a major point of view in regard to reserve estimates.

Table H–15 shows the total ultimately recoverable mineral-fuel reserves of the United States as of January 1, 1950. A coal reserve estimate of 1,212.79 billion tons is shown in this table. It includes measured, indicated, and inferred reserves of coal in both thick and thin beds, under light and heavy overburden.

Several attempts have been made to obtain comparable figures for petroleum and natural-gas reserves. These attempts have been based on the assumption that the total volume of marine sedimentary rock in the United States within range of exploration by drilling will yield petroleum and natural gas in amounts proportional to the yields obtained from the volume of rock explored thus far. The estimates are in good agreement. In 1948 Weeks estimated the original, potentially recoverable reserves of petroleum in the United States to be 110 billion barrels,[2] and in 1950 Pratt estimated the amount to be 100 billion barrels.[3] Using the same methods, Terry estimated the original, potentially recoverable natural-gas reserves in the United States to be 400 trillion cubic feet.[4]

[1] Fieldner, A. C., Coal for coke production: U. S. Bureau of Mines Information Circular 7559, pp. 13–14, 1950.

[2] Weeks, L. G., Highlights on 1947 Developments in Foreign Petroleum Fields: Am. Assoc. Petroleum Geologists Bull., vol. 32, No. 6, p. 1094, 1948.

[3] Fanning, L. M., Our Oil Resources, second edition, p. 151, McGraw-Hill Book Co., New York, 1950.

[4] Fanning, L. M., Our Oil Resources, first edition, p. 149, McGraw-Hill Book Co., New York, 1945.

These figures, of course, are intended to represent total potentially recoverable original reserves; that is to say, past production, present proved reserves, and assumed future discoveries. To make them comparable with the figure for total potentially recoverable coal reserves as of January 1, 1950, they must be reduced to allow for production to January 1, 1950. The figure used in table H–15 of 61.07 billion barrels for potentially recoverable petroleum reserves as of January 1, 1950, was obtained by subtracting total recorded production of petroleum to January 1, 1950, from Pratt's estimate of 100 billion barrels. Similarly, the figure of 277.64 trillion cubic feet for potentially recoverable natural-gas reserves as of January 1, 1950, was obtained by subtracting total recorded production of natural gas to January 1, 1950, from Terry's estimate of 400 trillion cubic feet.

Table H–16, which is prepared on a more conservative basis than table H–15, shows what is here termed the total assured recoverable mineral-fuel reserves of the United States as of January 1, 1950. The estimates of 28.38 billion barrels of petroleum and 180.38 trillion cubic feet of natural gas shown in table H–16 represent proved reserves as currently appraised by the American Petroleum Institute and the American Gas Association.[5] To correspond with these estimates, an estimate for coal reserves is included that is intended to represent only measured and indicated reserves of coal in beds 28 inches thick or more under less than 2,000 feet of overburden. The figure of 363.85 billion tons for assured coal reserves in this restricted category was derived from a consideration of the reserve estimates for Michigan, Montana, New Mexico, North Carolina, and Wyoming for which the reserves of coal have been classified according to thickness of bed and overburden. On an average in these States, the measured and indicated reserves of coal in beds 28 inches thick or more, under less than 2,000 feet of overburden, total roughly 30 percent of the total coal reserves. This percentage was, therefore, applied to the figure for total recoverable coal reserves of the United States shown in table H–15 to obtain the estimate for assured coal reserves shown in table H–16. A further study of the same five States indicates that approximately half of the assured coal reserves, or 15 percent of the total coal reserves, can be regarded as measured reserves of coal in beds 28 inches thick or more under less than 2,000 feet of overburden.

According to tables H–15 and H–16, the reserves of coal in the United States, when compared on a B. t. u. basis, represent 87.43 percent of the total potentially recoverable mineral-fuel reserves, or 83.06 percent of the total assured recoverable mineral-fuel reserves. It is interesting to note that these two figures are so nearly the same.

### Life Expectancy of United States Fuel Reserves[6]

Because of the many imponderable factors to be taken into consideration, it is impossible to estimate the life expectancy of fuel reserves in the United States with any degree of accuracy.

Appraisal of the life expectancy of any individual fuel is further complicated by the interchangeability of most fuels, and by a choice of fuel, at most installations, largely determined by cost.

Because the life expectancy of petroleum and natural-gas reserves will be greatly extended as the relative use of coal and other fuels is increased, and because of the possibility of additions to petroleum and natural-gas reserves, not allowed for in this report, an estimate of the life expectancy of any of these fuels is subject to serious questions.

The life expectancy of coal reserves is influenced by several additional factors. At present only about 30 percent of the total coal reserves in the United States can be said to be accurately measured or definitely indicated to be present from available information on the distribution and thickness of coal beds and coal-bearing rocks, and its true quantity remains to be verified. Reserves, recoverability, and utilization of coal are subject to much change in the future, which will affect any estimate of life expectancy.

Although it is thus impossible to predict the life expectancy of the several mineral fuels, the ratios between the currently estimated recoverable reserves of each fuel and the present annual rates of production provide figures that are somewhat more meaningful for comparative purposes than the reserve figures alone. As shown in table H–15, the ultimately recoverable reserves of coal in the United States are 1,612 times the average annual production during the period 1940 to 1950, the ultimately recoverable reserves of petroleum are 34 times the average

[5] The Oil and Gas Journal, vol. 48, No. 45, pp. 56–57, March 16, 1950.
[6] Summarized from text of GS Circular 94, to explain tables H–15 and H–16.

annual production, and the ultimately recoverable reserves of natural gas are 59 times the average annual production.

Table H–16, which is identical in arrangement to table H–15, but based more conservatively on appraisals of proved or definitely assured reserves, shows that the assured recoverable reserves of coal in the United States are 484 times recent average annual production, the assured reserves of petroleum are 16 times the average annual production, and the assured reserves of natural gas are 38 times the average annual production.

From a consideration of the probable trends in the use of these fuels, it is apparent that their probable life expectancy is quite different from the simple ratios of present production as compared to reserves. Petroleum and natural gas reserves certainly have a much longer life expectancy than the ratios indicate; and coal reserves, conversely, have a shorter life expectancy.

TABLE H–15.—*Total ultimately recoverable mineral-fuel reserves of the United States, Jan. 1, 1950*

| Type of mineral fuel | Ultimately recoverable reserves and average annual production (coal in billions of short tons; petroleum, bitumen from bituminous sandstone and oil from oil shale in billions of barrels; and natural gas in trillions of cubic feet) | | Ultimately recoverable reserves and average annual production (in quadrillions of B. t. u.'s) [1] | | Ratio of ultimately recoverable reserves as currently appraised to average annual production 1940–50 | Percent of total ultimately recoverable mineral-fuel reserves on B. t. u. basis, Jan. 1, 1950 |
|---|---|---|---|---|---|---|
| | Ultimately recoverable reserves, Jan. 1, 1950 | Average annual production, 1940–50 | Ultimately recoverable reserves, Jan. 1, 1950 | Average annual production, 1940–50 | | |
| Coal: | | | | | | |
| Bituminous coal | 616.32 | 0.544 | 16,024.32 | 14.14 | ---------- | 55.14 |
| Subbituminous coal | 233.85 | .007 | 4,443.15 | .13 | ---------- | 15.29 |
| Lignite | 355.73 | .003 | 4,766.78 | .04 | ---------- | 16.40 |
| Anthracite and semi-anthracite | 6.89 | .057 | 175.01 | 1.45 | ---------- | .60 |
| Total coal, all ranks | [2] 1,212.79 | .611 | 25,409.26 | 15.76 | 1,612 | 87.43 |
| Petroleum | [3] 61.07 | 1.780 | 366.42 | 10.68 | 34 | 1.26 |
| Bitumen from bituminous sandstone | [4] 1.25 | ([5]) | 7.50 | ([5]) | ---------- | .03 |
| Oil from oil shale | [6] 500.00 | ([5]) | 3,000.00 | ([5]) | ---------- | 10.32 |
| Natural gas | [7] 277.64 | 4.710 | 277.64 | 4.71 | 59 | .96 |

[1] Reserves and production figures converted to B. t. u.'s according to the following heat values: Anthracite, 12,700 B. t. u.'s per pound; bituminous coal, 13,000 B. t. u.'s per pound; subbituminous coal, 9,500 B. t. u.'s per pound; lignite, 6,700 B. t. u.'s per pound; petroleum, bitumen from bituminous sandstone, and oil from oil shale, 6,000,000 B. t. u.'s per barrel; and natural gas, 1,000 B. t. u.'s per cubic foot.

[2] Tables H–11 and H–12.

[3] Recoverable reserves of petroleum remaining after subtracting petroleum production to Jan. 1, 1950, from original petroleum reserves of 100,000,000,000 barrels, as estimated by W. E. Pratt in Our Oil Resources, second edition, edited by L. M. Fanning, McGraw-Hill Book Co., New York, 1950. Figure does not include Continental Shelves.

[4] 50 percent of estimated measured, indicated, and inferred reserves of bitumen from bituminous sandstone in deposits near Vernal and Sunnyside, Utah; Casmalia, Santa Cruz, Edna, Sisquac, Sulphur Mountain, and San Ardo, Calif.; and Uvalde, Tex.

[5] Negligible.

[6] 50 percent of reserves of oil in oil-shale deposits having an average content of 15 barrels of oil per ton, as estimated by D. C. Duncan, U. S. Geological Survey. Personal communication.

[7] Recoverable reserves of natural gas remaining after subtracting natural gas production to Jan. 1, 1950, from original natural-gas reserves of 400,000,000,000 cubic feet, as estimated by L. F. Terry in Our Oil Reserves, first edition, edited by L. M. Fanning, McGraw-Hill Book Co., New York, 1945. Figure does not include Continental Shelves.

TABLE H–16.—*Total assured recoverable mineral-fuel reserves of the United States, Jan. 1, 1950*

| Type of mineral fuel | Assured recoverable reserves and average annual production (coal in billions of short tons; petroleum, bitumen from bituminous sandstone, and oil from oil shale in billions of barrels; and natural gas in trillions of cubic feet) | | Assured recoverable reserves and average annual production (in quadrillions of B. t. u.'s) [1] | | Ratio of assured recoverable reserves as currently appraised to average annual production 1940–50 | Percent of total assured recoverable mineral-fuel reserves on B. t. u. basis Jan. 1, 1950 |
|---|---|---|---|---|---|---|
| | Assured recoverable reserves Jan. 1, 1950 | Average annual production 1940–50 | Assured recoverable reserves Jan. 1, 1950 | Average annual production 1940–50 | | |
| Coal: | | | | | | |
| Bituminous coal | [2] 184.90 | 0.544 | 4,807.40 | 14.14 | ---------- | 52.38 |
| Subbituminous coal | [2] 70.16 | .007 | 1,333.04 | .13 | ---------- | 14.53 |
| Lignite | [2] 106.72 | .003 | 1,430.05 | .04 | ---------- | 15.58 |
| Anthracite and semianthracite | [2] 2.07 | .057 | 52.58 | 1.45 | ---------- | .57 |
| Total coal, all ranks | 363.85 | .611 | 7,623.07 | 15.76 | 484 | 83.06 |
| Petroleum | [3 4] 28.38 | 1.780 | 170.28 | 10.68 | 16 | 1.86 |
| Bitumen from bituminous sandstone | [5] .65 | ([6]) | 3.90 | ([6]) | ---------- | .04 |
| Oil from oil shale | [7] 200.00 | ([6]) | 1,200.00 | ([6]) | ---------- | 13.08 |
| Natural gas | [8] 180.38 | 4.710 | 180.38 | 4.71 | 38 | 1.96 |

[1] Reserves and production figures converted to B. t. u.'s according to the following heat values: Anthracite, 12,700 B. t. u.'s per pounds; bituminous coal, 13,000 B. t. u.'s per pound; subbituminous coal, 9,500 B. t. u.'s per pound; lignite, 6,700 B. t. u.'s per pound; petroleum, bitumen from bituminous sandstone, and oil from oil shale, 6,000,000 B. t. u.'s per barrel; and natural gas, 1,000 B. t. u.'s per cubic foot.

[2] 30 percent of reserves as shown in table 1, as determined by a consideration of 5 States for which reserve estimates have been classified by thickness of bed and amount of overburden. The estimate is intended to show reserves of measured and indicated coal in beds at least 28 inches thick, under no more than 2,000 feet of overburden.

[3] Includes 3.73 billions barrels of natural gas liquids.

[4] Estimate by the American Petroleum Institute, as reported in the Oil and Gas Journal, vol. 48, No. 45, pp. 56–57, Mar. 16, 1950.

[5] 50 percent of measured and indicated reserves of bitumen from bituminous sandstone in deposits near Vernal and Sunnyside, Utah; Casmalia, Santa Cruz, and Edna, Calif.; and Uvalde, Tex.

[6] Negligible.

[7] 60 percent of measured reserves as estimated by Carl Belser in Oil Shale Resources of Colorado, Utah, and Wyoming, American Institute of Mining and Metallurgical Engineers, technical publication No. 2358, 1948.

[8] Estimate by the American Gas Association as reported in the Oil and Gas Journal, vol. 48, No. 45, pp. 56–57, Mar. 16, 1950.

Source: Geological Survey, Circular 94, 1950.

### *Water-power resources*

Undeveloped water-power resources as estimated by the Federal Power Commission in 1949 (table H–17) totaled almost 77 million kilowatts of potential generating capacity equivalent to a potential average annual generation of over 390 billion kilowatt-hours. This can be compared to the national existing hydrogenerating capacity of 18 million kilowatts with an annual output of 50 billion kilowatts. However, broad economic considerations of the need for power in each producing area, investment costs, comparative feasibility based

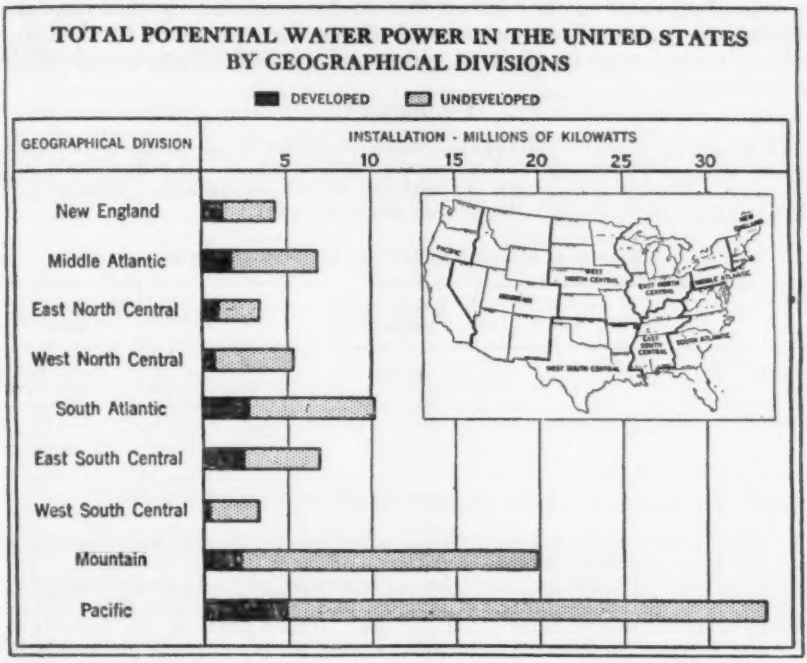
on alternate sources of power, accessibility to market, and integration with other hydro and steam plants in each area will govern largely whether a particular plant is to be constructed. In addition, the multipurpose merits of individual projects for flood control, irrigation, and other purposes will play a large role in determining the desirability of development.

TABLE H–17.—*Estimated undeveloped water power in the United States by geographical divisions and States*

| Division—State | Estimated potential installed generating capacity (kilowatts) | Estimated potential average annual generation (thousand kilowatt-hours) | Division—State | Estimated potential installed generating capacity (kilowatts) | Estimated potential average annual generation (thousand kilowatt-hours) |
|---|---|---|---|---|---|
| United States | 76,901,000 | 390,706,000 | South Atlantic: | | |
| New England | 3,119,000 | 10,560,000 | Delaware | 0 | 0 |
| Middle Atlantic | 5,175,000 | 20,299,000 | Maryland | 463,000 | 2,800,000 |
| East North Central | 2,574,000 | 10,286,000 | District of Columbia | 60,000 | 263,000 |
| West North Central | 4,735,000 | 21,736,000 | Virginia | 916,000 | 5,100,000 |
| South Atlantic | 7,462,000 | 39,303,000 | West Virginia | 2,600,000 | 13,600,000 |
| East South Central | 4,552,000 | 22,134,000 | North Carolina | 716,000 | 2,300,000 |
| West South Central | 2,894,000 | 9,904,000 | South Carolina | 515,000 | 2,300,000 |
| Mountain | 17,755,000 | 100,483,000 | Georgia | 2,004,000 | 11,800,000 |
| Pacific | 28,635,000 | 156,000,000 | Florida | 188,000 | 1,140,000 |
| New England: | | | East South Central: | | |
| Maine | 1,807,000 | 6,800,000 | Kentucky | 1,695,000 | 7,600,000 |
| New Hampshire | 566,000 | 1,600,000 | Tennessee | 737,000 | 4,734,000 |
| Vermont | 476,000 | 1,390,000 | Alabama | 1,590,000 | 8,000,000 |
| Massachusetts | 160,000 | 360,000 | Mississippi | 530,000 | 1,800,000 |
| Rhode Island | 0 | 0 | West South Central: | | |
| Connecticut | 110,000 | 410,000 | Arkansas | 1,142,000 | 4,700,000 |
| Middle Atlantic: | | | Louisiana | 128,000 | 724,000 |
| New York | 2,738,000 | 11,300,000 | Oklahoma | 832,000 | 2,180,000 |
| New Jersey | 105,000 | 324,000 | Texas | 792,000 | 2,300,000 |
| Pennsylvania | 2,332,000 | 8,675,000 | Mountain: | | |
| East North Central: | | | Montana | 3,711,000 | 20,000,000 |
| Ohio | 169,000 | 740,000 | Idaho | 7,746,000 | 49,000,000 |
| Indiana | 378,000 | 1,270,000 | Wyoming | 928,000 | 4,350,000 |
| Illinois | 1,193,000 | 5,300,000 | Colorado | 1,116,000 | 4,900,000 |
| Michigan | 305,000 | 1,336,000 | New Mexico | 183,000 | 815,000 |
| Wisconsin | 529,000 | 1,640,000 | Arizona | 2,731,000 | 14,333,000 |
| West North Central: | | | Utah | 1,081,000 | 5,951,000 |
| Minnesota | 310,000 | 1,359,000 | Nevada | 259,000 | 1,134,000 |
| Iowa | 477,000 | 2,250,000 | Pacific: | | |
| Missouri | 2,073,000 | 8,700,000 | Washington | 14,182,000 | 84,000,000 |
| North Dakota | 320,000 | 1,685,000 | Oregon | 6,528,000 | 37,000,000 |
| South Dakota | 1,097,000 | 5,559,000 | California | 7,925,000 | 35,000,000 |
| Nebraska | 314,000 | 1,549,000 | | | |
| Kansas | 144,000 | 634,000 | | | |

Source: Federal Power Commission.

FIGURE H–3.




Source: Federal Power Commission.

*Synthetic liquid fuel from shale*

Oil shale may prove to be an important supplementary source of liquid fuel in the United States. Experience so far has demonstrated that production of oil from shale is technically feasible. More work is required, however, to provide guidance as to economic aspects. Although no attempt has been made to estimate oil shale reserves precisely, enough is known to indicate that the reserves are vast and fairly accessible. The oil shale deposits in Colorado, alone, are estimated to have a potential yield of at least three-fourths trillion barrels from those parts of the deposits yielding an average of 15 gallons or more per ton. Richer parts of the deposits in Colorado which may yield 25 to 30 gallons per ton of shale in beds from 50 to 480 feet thick, may yield as much as 100 billion barrels of oil, disregarding mining losses.

The States of Illinois, Missouri, Indiana, Michigan, New York, Kentucky, Ohio, Pennsylvania, and Tennessee as well as another group of Western States, Montana, Wyoming, and Idaho have widespread deposits of black shale rich in organic matter. These deposits have an oil yield averaging less than 15 gallons of oil per ton in minable thicknesses of 15 feet or more and are at present generally considered of less economic interest than those mentioned above.

Although data are incomplete for an accurate estimate of the total reserve of oil shale in the United States, it appears likely that deposits yielding 10 to 50 gallons or more of oil per ton contain a total of one trillion barrels or more of oil, of which perhaps 500 billion barrels could be recovered.

### Oil Shale [1]

The richest oil-shale deposits in the United States are in the Green River formation of early Tertiary age and these are distributed in Colorado, Utah, and Wyoming. Smaller high grade deposits are known in Nevada. Estimates of reserves prepared in 1928 by Winchester are as follows:

*Estimate of oil recoverable from Tertiary oil shales*

| State | Average oil yield, gallons per ton | Total oil, barrels | Recoverable oil, barrels [1] |
|---|---|---|---|
| Colorado | Greater than 15 | 79, 625, 998, 000 | 47, 625, 598, 000 |
| Utah | do | 42, 800, 000, 000 | 25, 680, 000, 000 |
| Wyoming | do | 3, 044, 000, 000 | 1, 826, 400, 000 |
| Nevada | do | 6, 039, 000 | 3, 623, 400 |
| Total | | 125, 476, 037, 000 | 75, 335, 721, 000 |

[1] Assumes that 60 percent of the shale in the ground will reach the retorts and be treated.

Winchester's estimates, prepared from incomplete sample, data are known to be conservative on the basis of more recent exploration in parts of the region. The oil-shale deposits in Colorado, alone, are estimated to have a potential yield of at least three-fourths trillion barrels of oil from parts of the deposits that yield an average of 15 gallons or more of oil per ton. Richer parts of the deposits in Colorado, however, yielding 25 to 30 gallons of oil per ton through thicknesses of about 50 to 480 feet, are estimated to have a total potential yield in excess of 100 billion barrels of oil, disregarding mining losses.

Although deposits of black shale rich in organic matter are widespread throughout several Eastern States, namely, Illinois, Missouri, Indiana, Michigan, New York, Kentucky, Ohio, Pennsylvania, and Tennessee, and in some Western States such as Montana, Wyoming, and Idaho, these generally have an oil yield averaging less than 15 gallons of oil per ton through minable thicknesses of 15 feet or more, and are generally of little interest as a source of liquid fuel at the present.

Reserve estimates prepared by Winchester are available for parts of these deposits as follows:

*Estimates of recoverable oil from Devonian black shales*

| State | Average oil yield, gallons per ton | Total oil, barrels | Recoverable oil, barrels |
|---|---|---|---|
| Indiana | Greater than 10 | 7, 680, 000, 000 | 6, 912, 000, 000 |
| Kentucky | do | 10, 978, 560, 000 | 9, 880, 704, 000 |
| Total | | 18, 658, 560, 000 | 16, 792, 704, 000 |

[1] Statement by U. S. Geological Survey.

## OIL-SHALE RESOURCES [1]

Although oil shale is found in Alaska and 20 States of the Union, the shales of the vast Green River formation of Colorado, Utah, and Wyoming are by far the richest.

It was stated in the 1948 report that the main oil-shale deposits were contained in a 1,000-square-mile area in western Colorado. From the limited knowledge available at that time, these deposits appeared to be more amenable to exploitation, more persistent, and apparently richer than elsewhere in the Rocky Mountain region. Original estimates indicated that the 1,000-square-mile area contained a measure of shale about 500 feet thick, with an average assay of 15 gallons a ton, or the equivalent of 300 billion barrels of shale oil if it were possible to process all of the shale and obtain a yield of 100 percent of assay. The lower segment of this measure, known as the Mahogany ledge, ranging in thickness from 70 to 94 feet and averaging about 30 gallons a ton, was estimated to be capable of yielding 100 billion barrels of shale oil, allowing 25 percent for mining losses. Only the Mahogany ledge is considered to be of prospective economic importance for the establishment of an oil-shale industry in the relatively near future.

Since the original estimates were made, data have been made available from 14 core-drill holes which were drilled by oil companies and 8 holes drilled by the Bureau of Mines in 1948 and 1949. Of these holes, 19 were drilled on the south and southwestern portions of the 1,000-square-mile area, and 3 were drilled outside of the area—2 on the eastern edge of the formation and 1 south of the Colorado River in the southeastern corner. Assay results of drill cuttings from four gas wells drilled in the northern portion of the area and of four surface sections taken on the northern edge also were obtained.

Data compiled from the core holes and surface sections outside the boundaries of the 1,000-square-mile area tend to confirm the conclusion that the shale-oil content diminishes rapidly as the outer edges of the old lake basin are approached.

Assay results of 20 core holes, including 4 drilled by the Bureau of Mines in 1945 and 1946, that are within the 1,000-square-mile boundary, support the original estimates of 300 billion and 100 billion barrels as the shale-oil equivalents of the shale deposits in the 500-foot measure and the Mahogany ledge, respectively. Moreover, the data show that, if the minimum average assay considered is decreased from 30 gallons to 25 gallons a ton, the shale-oil equivalent of the shale deposit in the Mahogany ledge is increased to 126 billion barrels. This is 26 percent more than the original estimate. The thickness of the Mahogany ledge would average 108 feet throughout the area.

The four gas wells from which data were obtained in 1948 and 1949 penetrated an oil-shale zone below the Mahogany ledge. These holes indicate an additional deposit equivalent to about 1,200,000,000 barrels of shale oil; however, the estimate of the deposit of shale assaying 25 gallons a ton or more is not increased, and the data are so limited that a further increase in the estimate of the total deposit is not justified at this time. Only an extensive drilling program in the future can definitely block out the total oil-shale deposits and afford basis for reliable estimates of the reserves from which shale oil can be recovered in northwestern Colorado.

Before 1948, little was known of the potential oil yield of the Green River formation in Utah and Wyoming. During 1948 drill cuttings were obtained from 10 oil wells drilled in Utah and Wyoming, representing 15,248 feet of Green River formation. These wells did not penetrate the Mahogany ledge in either State and therefore were considered inconclusive. In 1949, 1,588 samples were taken from 16 oil wells drilled in Utah and Wyoming, representing 18,668 feet of Green River formation. The samples from one well in Utah indicated a 90-foot Mahogany ledge averaging 25 gallons a ton, or 104,221,000 barrels per square mile. One well in Wyoming also indicated the possibility of oil shale that may be of future commercial significance, but as the samples were "spotty" they are not considered to be conclusive.

The 1948 report mentioned that field examinations had been made of the oil-shale deposits of Ohio, Indiana, Kentucky, Tennessee, Nevada, and the oil shale contained in the Phosphoria formation of Montana, Idaho, and Wyoming. Although these formations contain immense tonnages of oil shale, the shale beds are either too low in oil yield or are too thin to offer promise of commercial exploitation except possibly in the very distant future.

[1] From Synthetic Liquid Fuels, Annual Report of the Secretary of the Interior for 1949.

76468—51——13

FIGURE H–5.—ANNUAL PRODUCTION OF PETROLEUM AND DISCOVERY OF NEW RESERVES.

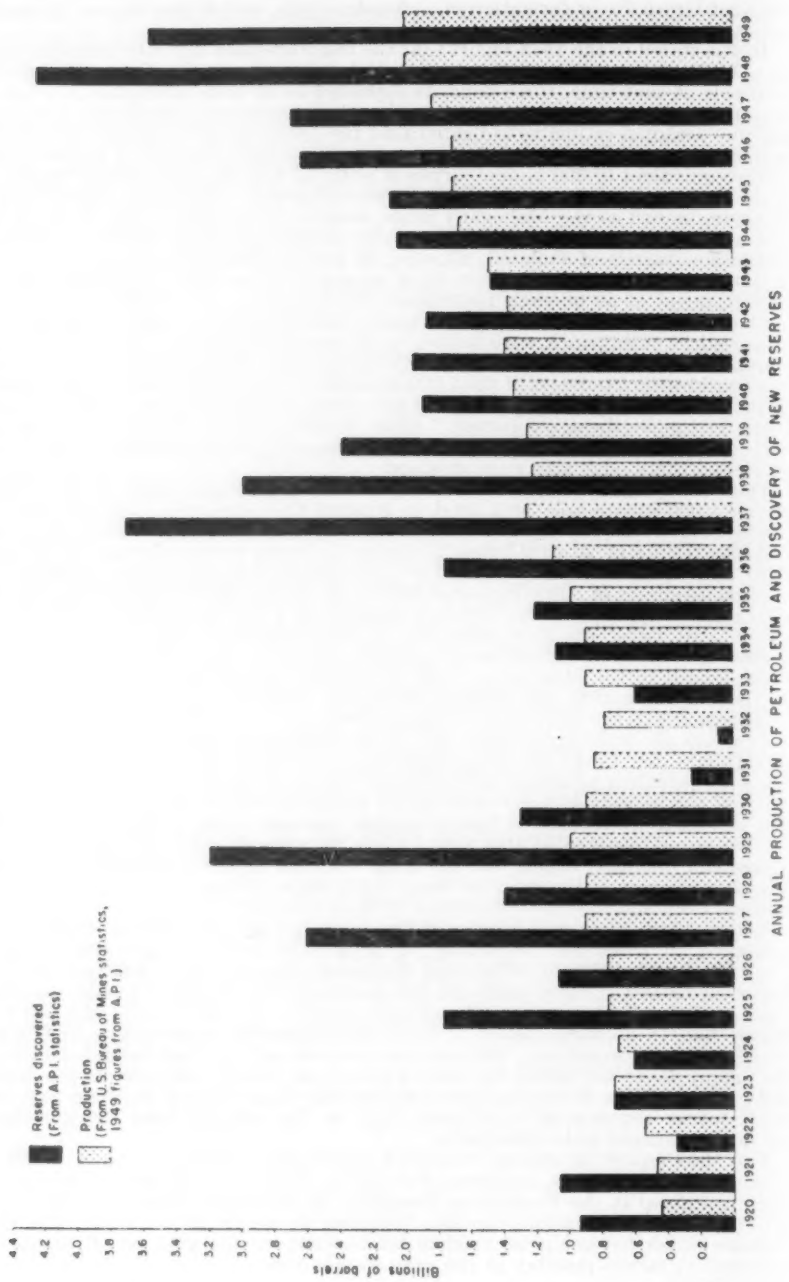
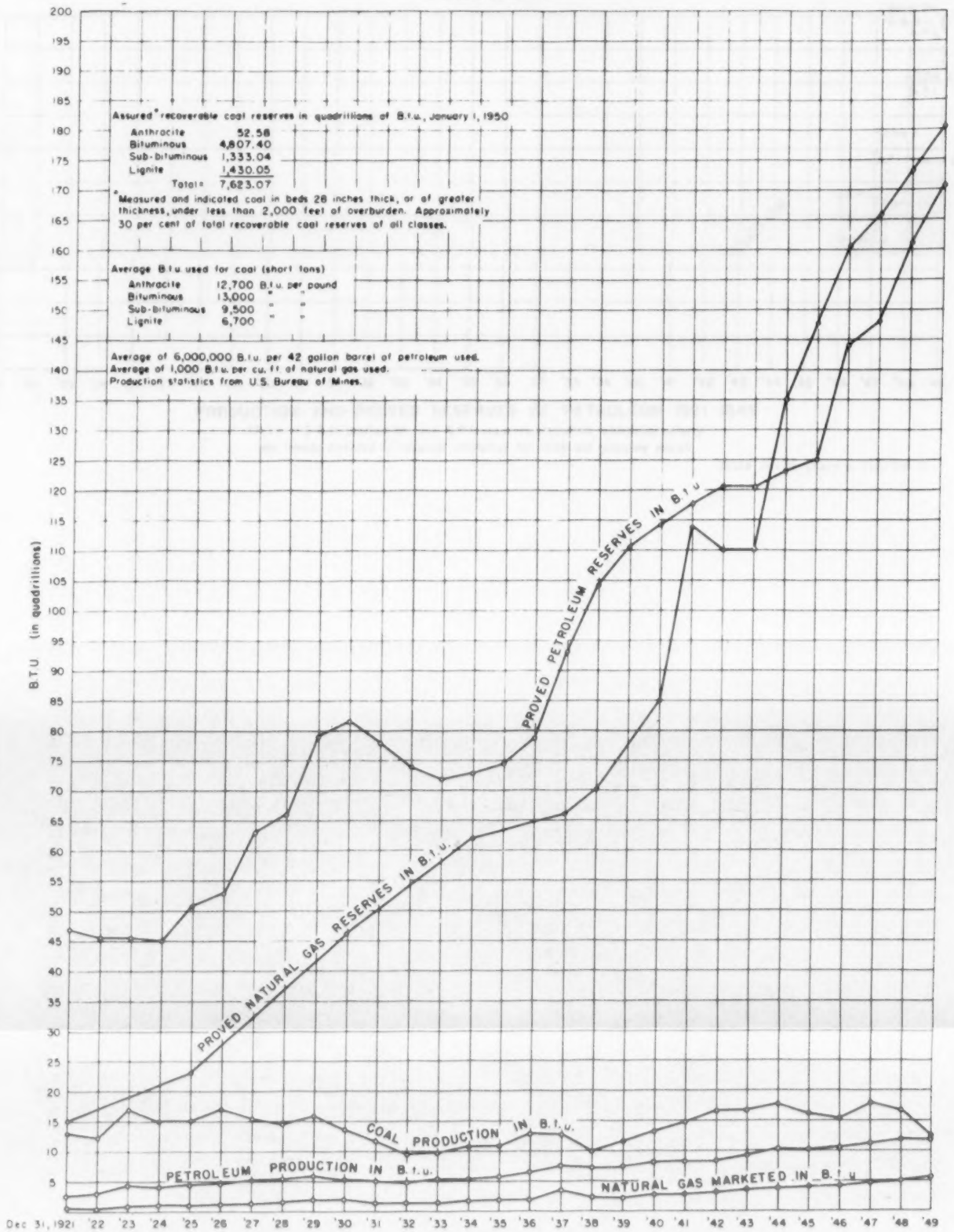


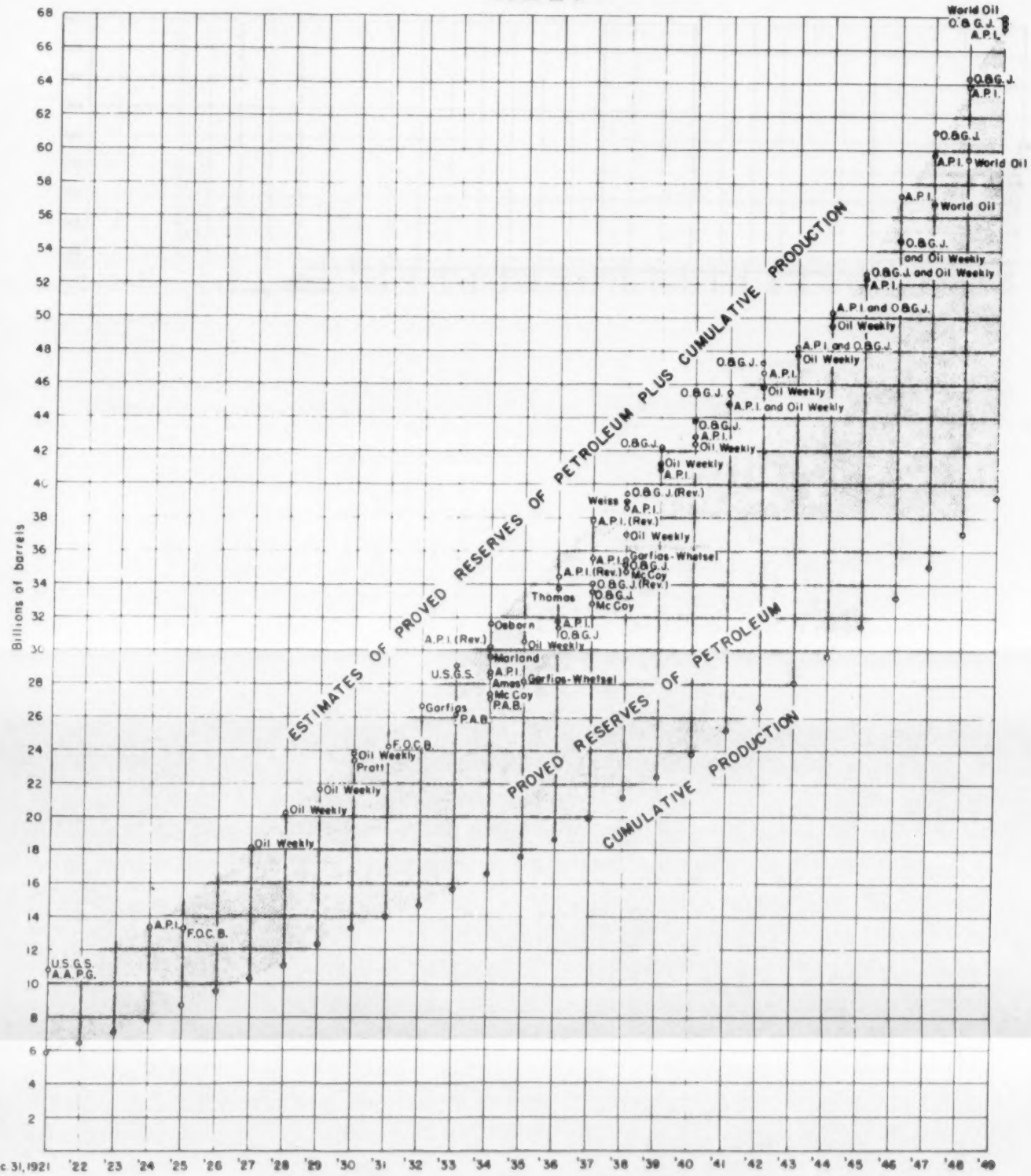
FIGURE H–4


Assured* recoverable coal reserves in quadrillions of B.t.u., January 1, 1950
Anthracite 52.58
Bituminous 4,807.40
Sub-bituminous 1,333.04
Lignite 1,430.05
Total 7,623.07
*Measured and indicated coal in beds 28 inches thick, or of greater thickness, under less than 2,000 feet of overburden. Approximately 30 per cent of total recoverable coal reserves of all classes.
Average B.t.u. used for coal (short tons)
Anthracite 12,700 B.t.u. per pound
Bituminous 13,000 " "
Sub-bituminous 9,500 " "
Lignite 6,700 " "
Average of 6,000,000 B.t.u. per 42 gallon barrel of petroleum used.
Average of 1,000 B.t.u. per cu. ft of natural gas used.
Production statistics from U.S. Bureau of Mines.
B.T.U. (in quadrillions)
PROVED PETROLEUM RESERVES IN B.T.U.
PROVED NATURAL GAS RESERVES IN B.T.U.
COAL PRODUCTION IN B.T.U.
PETROLEUM PRODUCTION IN B.T.U.
NATURAL GAS MARKETED IN B.T.U.
Dec 31, 1921 '22 '23 '24 '25 '26 '27 '28 '29 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49

ANNUAL PRODUCTION OF COAL AND PETROLEUM, AND NATURAL GAS MARKETED IN B.T.U., AND PROVED RESERVES OF PETROLEUM AND NATURAL GAS IN B.T.U. FROM 1921-1949

76468 O - 51 (Face p. 172) No. 1

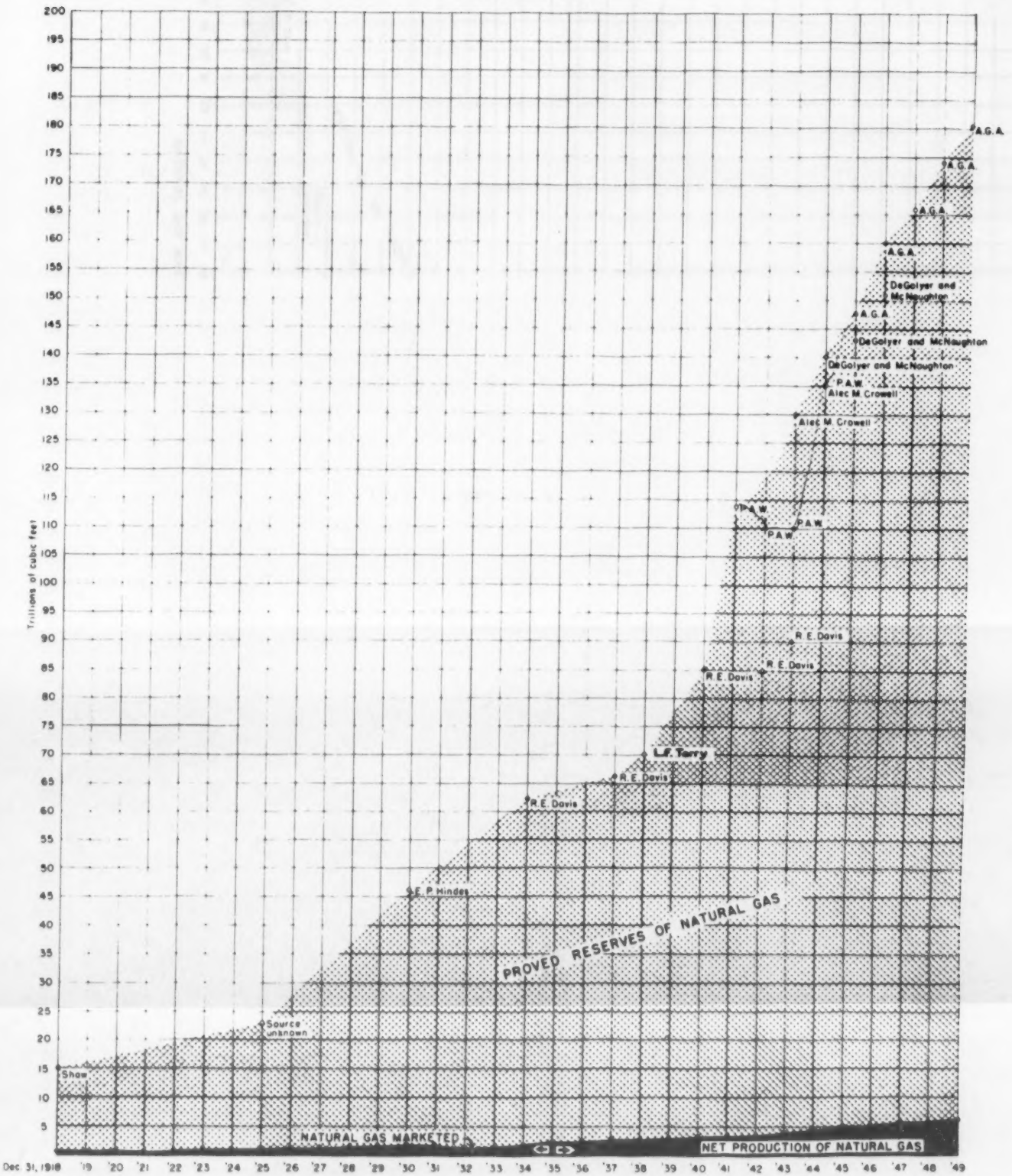
FIGURE H–6




PRODUCTION AND PROVED RESERVES OF PETROLEUM 1921-1949

(From U.S.B.M. production and A.P.I. reserves statistics; additional natural gas liquids included in reserves statistics for 1946 and following years)

FIGURE H–7




NATURAL GAS RESERVES AND PRODUCTION FROM 1918-1949

Production statistics from U.S. Bureau of Mines. Data on net production available for 1935 and following years.

76468 O - 51 (Face p. 172) No. 3

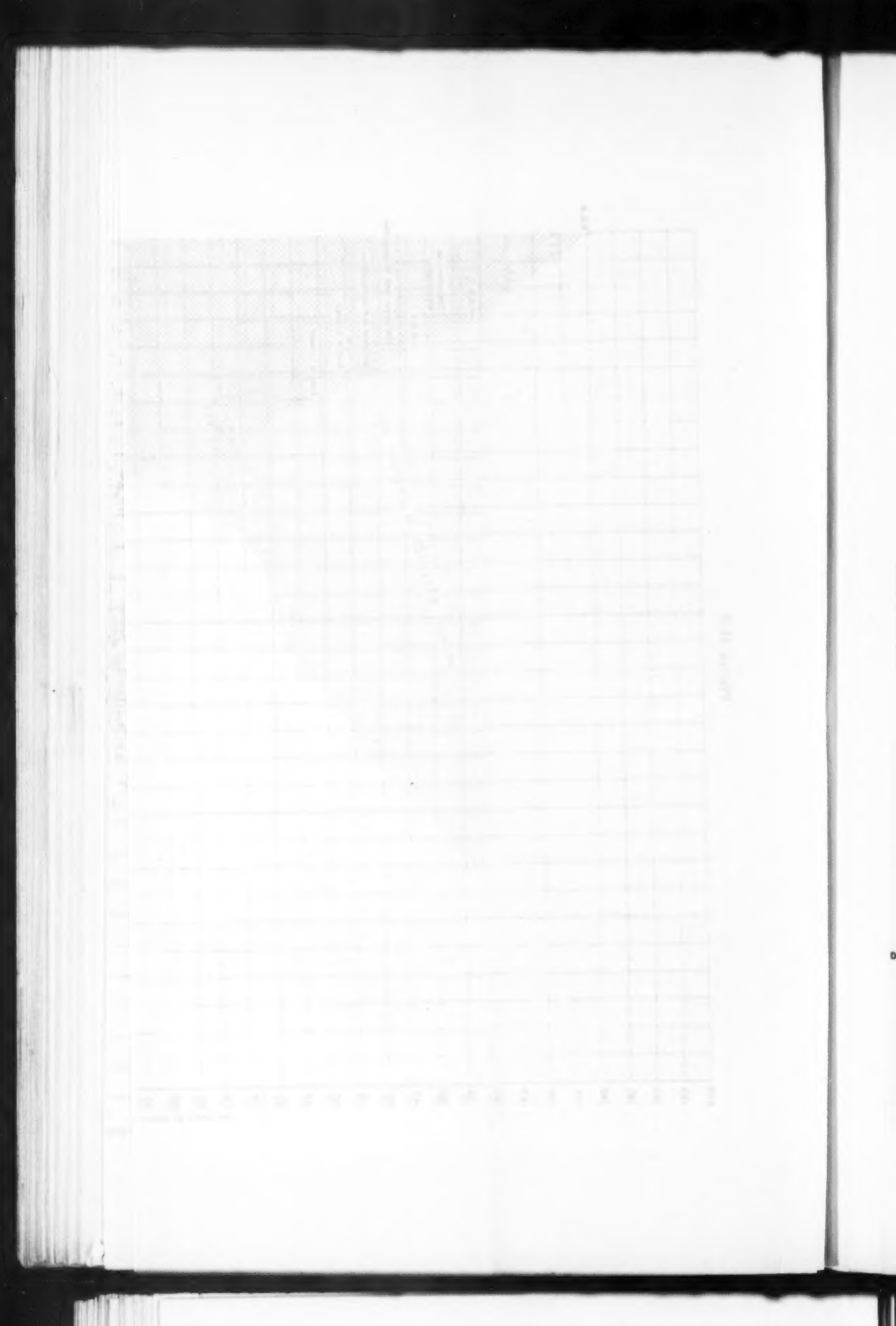
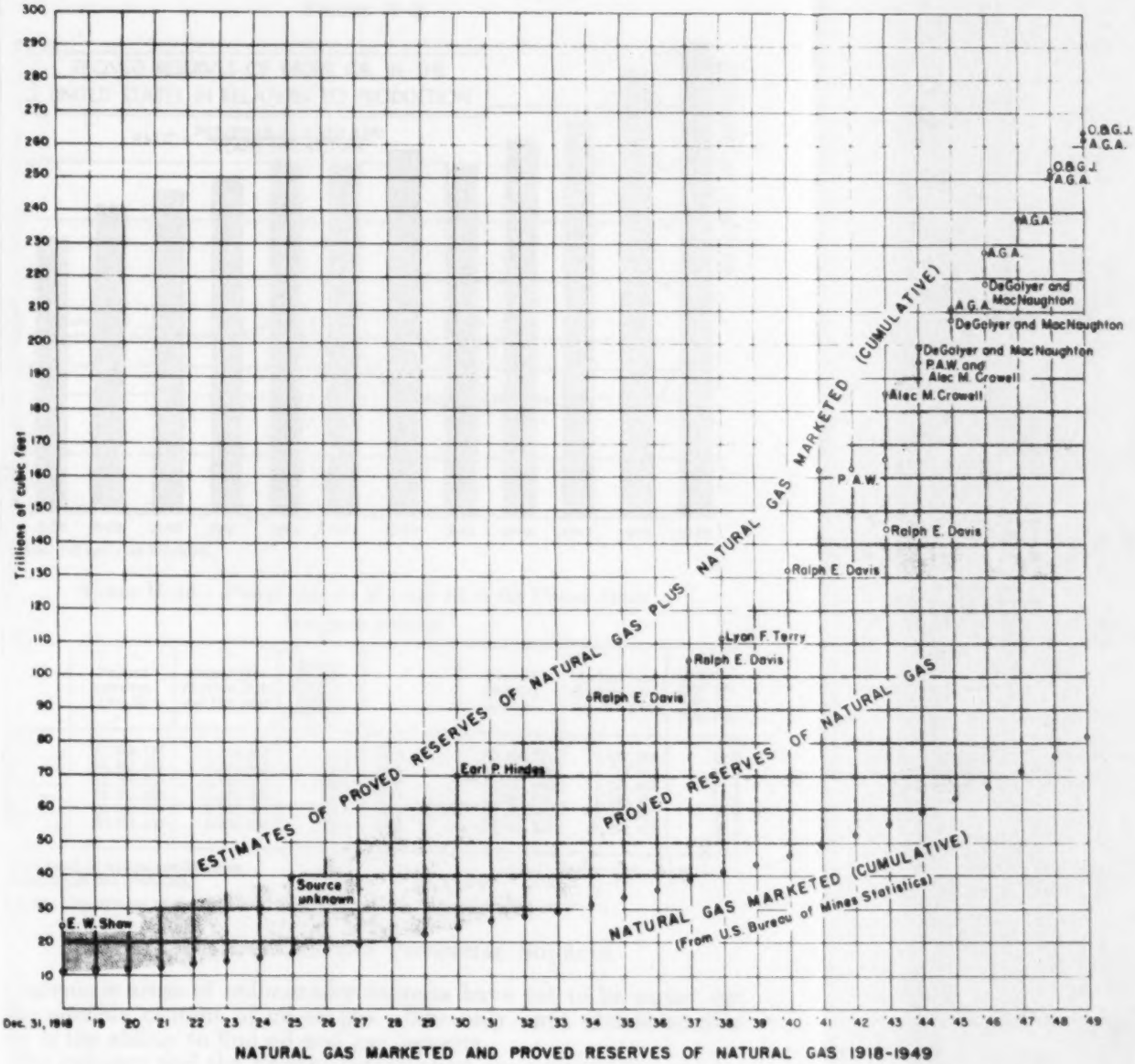


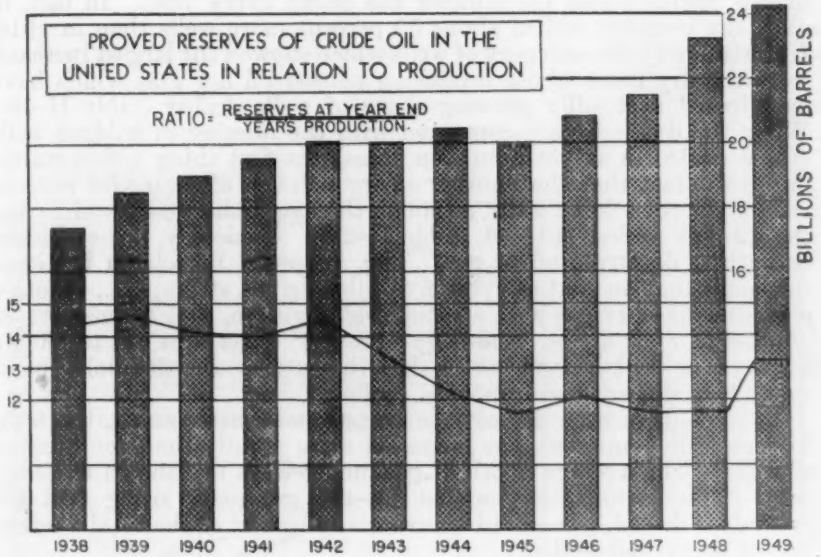
FIGURE H–8




NATURAL GAS MARKETED AND PROVED RESERVES OF NATURAL GAS 1918-1949

76468 O - 51 (Face p. 172) No. 4

FIGURE H–9.




Source: Oil and Gas Division.

TABLE H–18.—*Proved reserves of crude oil in the United States*

[Thousands of barrels]

| | Proved reserves Dec. 31 | Actual production during the year | Ratio, production to reserves | | Proved reserves Dec. 31 | Actual production during the year | Ratio, production to reserves |
|---|---|---|---|---|---|---|---|
| 1938 | 17,348,146 | 1,214,355 | 14.3 | 1944 | 20,453,231 | 1,677,904 | 12.2 |
| 1939 | 18,483,012 | 1,264,962 | 14.6 | 1945 | [1] 19,941,846 | 1,713,655 | 11.6 |
| 1940 | 19,024,515 | 1,353,214 | 14.1 | 1946 | [1] 20,873,560 | 1,733,939 | 12.1 |
| 1941 | 19,589,296 | 1,402,228 | 14.0 | 1947 | 21,487,685 | 1,856,987 | 11.6 |
| 1942 | 20,082,793 | 1,386,645 | 14.5 | 1948 | 23,280,444 | 2,016,282 | 11.6 |
| 1943 | 20,064,152 | 1,505,613 | 13.3 | 1949 | [2] 24,288,133 | 1,840,695 | 13.2 |

[1] New basis excluding condensates.
[2] Final figure not available.

Source: Department of the Interior Oil and Gas Division, February 1950.

## 2. NEW DISCOVERIES AND POTENTIAL SOURCES

Enormous areas of sedimentary deposits have yet to be tested for their possible content of oil or gas. The only limit visible at this time is the ability to find oil and gas deposits.

The industry and the Federal Government are actively engaged in attempting to learn more details as to the actual extent of the Nation's energy resources.

The petroleum and natural gas industries are constantly prospecting and drilling new wells. Recent large discoveries, such as those in Scurry County, Tex., in the Bakersfield area of California, and in Alberta Province in Canada provide encouragement to continue the research.

Data for annual exploratory effort in terms of number of wells drilled, indicate that the number has grown every year. In fact, in 1949 the industry drilled about 50 percent more wells than in 1918. Unfortunately, the category of wells which showed the largest increase, were the dry holes (those producing neither oil nor gas) which have constituted a steadily growing share of wells drilled (table H–19). When the dry holes are compared with the number of wildcat wells (those drilled in as yet unproven areas) the first thing which stands out is the fact that the number of dry holes at all times far exceeds the number of wildcat wells, although the margin has narrowed during the 12-year period 1937–49 (table H–20). Obviously, some wildcat operations do strike oil or gas. The American Petroleum Institute estimates that one out of every five wildcats is a strike; i. e., becomes a producing oil or gas well. It follows, therefore, that a considerable number of wells drilled in already "proved" areas turn out to be dry holes. The API has estimated that the ratio is one dry hole out of every four wells drilled in proved oil fields.

As wells have been drilled into deeper and deeper sands, the total footage drilled annually has increased more rapidly than the number of wells. The average depth of producing wells has shown a steady gain. This factor, compounded by the gradually rising cost for every foot drilled, has served substantially to add to the total average cost of every well drilled.

TABLE H–19.—*Wells drilled in United States*

| Year | Producing oil wells drilled | Condensate wells drilled | Gas wells drilled | Dry holes drilled | Total wells drilled [1] | Total footage drilled | Total producing oil wells as of Dec. 31 |
|---|---|---|---|---|---|---|---|
| | | | | | | *Thous. of ft.* | |
| 1918 | 17,860 | ---------- | 2,324 | 5,629 | 25,813 | [2] | 207,815 |
| 1919 | 21,041 | ---------- | 2,153 | 6,075 | 29,269 | [2] | 228,084 |
| 1920 | 24,278 | ---------- | 2,275 | 7,476 | 23,029 | [2] | 268,600 |
| 1921 | 14,715 | ---------- | 2,081 | 5,193 | 21,989 | [2] | 274,500 |
| 1922 | 17,790 | ---------- | 1,926 | 5,191 | 24,907 | [2] | 284,880 |
| 1923 | 16,182 | ---------- | 2,140 | 6,043 | 24,365 | [2] | 290,100 |
| 1924 | 14,707 | ---------- | 2,172 | 5,591 | 22,470 | [2] | 299,100 |
| 1925 | 17,029 | ---------- | 2,536 | 6,847 | 26,412 | 76,595 | 306,100 |
| 1926 | 18,626 | ---------- | 2,502 | 8,328 | 29,456 | 82,477 | 318,600 |
| 1927 | 14,382 | ---------- | 2,494 | 7,213 | 24,089 | 72,267 | 323,300 |
| 1928 | 12,505 | ---------- | 2,754 | 7,164 | 24,765 | 74,295 | 327,800 |
| 1929 | 15,758 | ---------- | 3,107 | 7,600 | 30,363 | 88,053 | 328,200 |
| 1930 | 12,133 | ---------- | 2,971 | 6,163 | 23,711 | 68,762 | 331,070 |
| 1931 | 7,061 | ---------- | 2,067 | 3,264 | 12,959 | 37,892 | 315,850 |
| 1932 | 10,569 | ---------- | 1,079 | 3,389 | 15,836 | 47,682 | 321,500 |
| 1933 | 7,887 | ---------- | 1,190 | 3,412 | 13,523 | 39,568 | 326,850 |
| 1934 | 13,119 | ---------- | 1,496 | 4,811 | 21,122 | 56,141 | 333,070 |
| 1935 | 15,418 | ---------- | 1,802 | 5,696 | 24,581 | 67,845 | 340,990 |
| 1936 | 18,704 | ---------- | 2,375 | 5,787 | 28,962 | 80,997 | 349,450 |
| 1937 | 23,115 | ---------- | 2,732 | 6,627 | 35,213 | 105,099 | 363,030 |
| 1938 | 19,106 | ---------- | 2,143 | 6,515 | 29,127 | 90,585 | 369,640 |
| 1939 | 17,734 | ---------- | 2,030 | 6,890 | 28,012 | 85,523 | 380,390 |
| 1940 | 19,843 | ---------- | 2,265 | 7,053 | 31,149 | 96,183 | 389,010 |
| 1941 | 19,590 | ---------- | 3,279 | 7,280 | 32,510 | 99,348 | 399,960 |
| 1942 | 10,977 | 105 | 2,685 | 5,962 | 21,990 | 67,903 | 404,840 |
| 1943 | 9,887 | 76 | 2,314 | 6,364 | 20,349 | 61,992 | 407,170 |
| 1944 | 13,502 | 54 | 3,024 | 7,153 | 25,786 | 84,378 | 412,220 |
| 1945 | 13,944 | 153 | 3,039 | 7,346 | 26,649 | 92,982 | 415,750 |
| 1946 | 16,087 | 207 | 3,355 | 8,496 | 30,230 | 101,125 | 421,460 |
| 1947 | 17,613 | 283 | 3,437 | 9,751 | 33,147 | 112,816 | 426,280 |
| 1948 | 22,197 | 346 | 2,966 | 11,939 | 39,477 | 134,659 | 439,608 |
| 1949 | 21,352 | 379 | 2,984 | 12,597 | 38,534 | 138,003 | 449,545 |

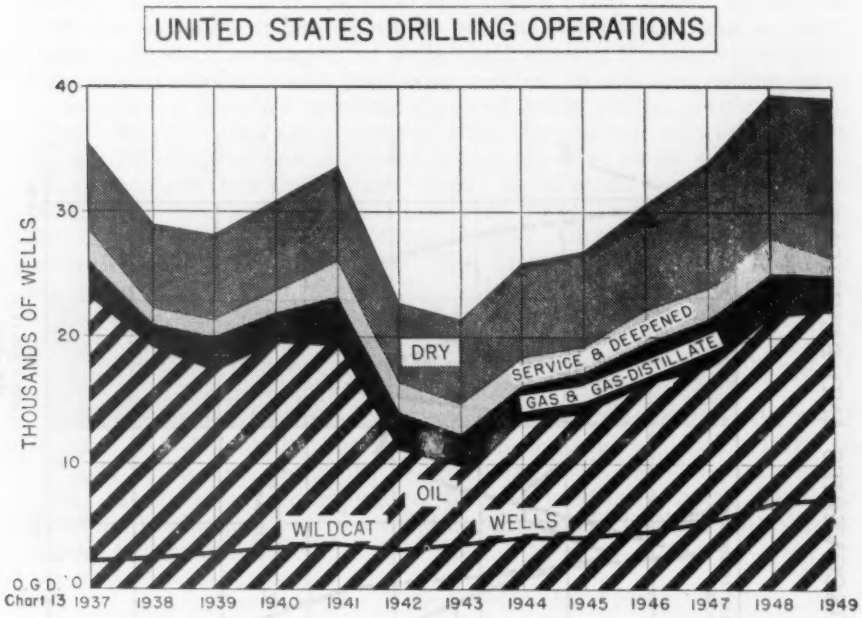
[1] Includes water input, gas injection, and salt-water-disposal wells. Authority: World Oil.
[2] Not available.

From De Golyer and MacNaughton, Twentieth Century Petroleum Statistics, 1950, p. 25.

FIGURE H-10.

## WELLS DRILLED AND CRUDE OIL DISCOVERIES AND REVISIONS

FIGURE H–11.




Source: Oil and Gas Division.

TABLE H–20.—*United States drilling operations—Wells*

| Year | Oil | Gas and distillate | Service and deepened | Dry | Wildcat |
|---|---|---|---|---|---|
| 1937 | 23,115 | 2,732 | 2,739 | 6,627 | 2,185 |
| 1938 | 19,106 | 2,143 | 1,363 | 6,515 | 2,457 |
| 1939 | 17,734 | 2,030 | 1,358 | 6,890 | 2,759 |
| 1940 | 19,843 | 2,265 | 1,988 | 7,053 | 2,982 |
| 1941 | 19,590 | 3,279 | 3,183 | 7,280 | 3,409 |
| 1942 | 10,977 | 2,790 | 2,844 | 5,962 | 3,001 |
| 1943 | 9,887 | 2,390 | 2,179 | 6,364 | 3,440 |
| 1944 | 13,502 | 3,078 | 2,430 | 7,153 | 4,057 |
| 1945 | 13,944 | 3,192 | 2,658 | 7,346 | 4,176 |
| 1946 | 16,087 | 3,562 | 2,700 | 8,496 | 4,524 |
| 1947 | 17,613 | 3,720 | 2,714 | 9,751 | 5,461 |
| 1948 | 21,760 | 3,387 | 2,660 | 11,512 | 6,877 |
| 1949 | 22,042 | 2,887 | 1,382 | 12,727 | 7,294 |

Source: Department of the Interior, Oil and Gas Division, February 1950.

TABLE H–21.—*Wells drilled for oil and gas in the United States, 1947–48, by months*

[Oil and Gas Journal]

| Wells | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Number | Percent |
| 1947 | | | | | | | | | | | | | | |
| Oil | 1,368 | 1,201 | 1,330 | 1,252 | 1,618 | 1,470 | 1,683 | 1,818 | 1,527 | 1,763 | 1,559 | 1,410 | 17,999 | 58.4 |
| Gas | 287 | 265 | 261 | 195 | 263 | 258 | 298 | 304 | 288 | 341 | 290 | 255 | 3,305 | 10.7 |
| Dry | 748 | 623 | 686 | 651 | 728 | 776 | 887 | 971 | 797 | 905 | 951 | 815 | 9,538 | 30.9 |
| Total | 2,403 | 2,089 | 2,277 | 2,098 | 2,609 | 2,504 | 2,868 | 3,093 | 2,612 | 3,009 | 2,800 | 2,480 | 30,842 | 100.0 |
| 1948 | | | | | | | | | | | | | | |
| Oil | 1,786 | 1,418 | 1,665 | 1,701 | 1,870 | 1,859 | 2,129 | 1,957 | 2,176 | 2,024 | 1,964 | 2,036 | 22,585 | 60.2 |
| Gas | 265 | 183 | 215 | 196 | 213 | 222 | 292 | 251 | 285 | 280 | 226 | 269 | 2,897 | 7.7 |
| Dry | 957 | 665 | 741 | 876 | 991 | 997 | 1,172 | 1,077 | 1,143 | 1,191 | 1,040 | 1,176 | 12,026 | 32.1 |
| Total | 3,008 | 2,266 | 2,621 | 2,773 | 3,074 | 3,078 | 3,593 | 3,285 | 3,604 | 3,495 | 3,230 | 3,481 | 37,508 | 100.0 |

*Wells drilled for oil and gas in the United States, 1947–48, by States and districts*

[Oil and Gas Journal]

| State and district | 1947 | | | | 1948 | | | |
|---|---|---|---|---|---|---|---|---|
| | Oil | Gas | Dry | Total | Oil | Gas | Dry | Total |
| Alabama | 5 | ------ | 24 | 29 | 1 | ------ | 20 | 21 |
| Arkansas | 182 | 10 | 137 | 329 | 151 | 5 | 145 | 301 |
| California | 1,639 | 45 | 369 | 2,053 | 2,395 | 21 | 460 | 2,876 |
| Colorado | 152 | 7 | 50 | 209 | 149 | 10 | 48 | 207 |
| Illinois | 1,054 | 10 | 969 | 2,033 | 1,262 | 11 | 1,165 | 2,438 |
| Indiana | 312 | 35 | 334 | 681 | 518 | 40 | 519 | 1,077 |
| Kansas | 1,303 | 452 | 912 | 2,667 | 1,677 | 382 | 1,193 | 3,252 |
| Kentucky | 289 | 110 | 261 | 660 | 349 | 151 | 403 | 903 |
| Louisiana: | | | | | | | | |
| Gulf coast | 443 | 15 | 193 | 651 | 457 | 21 | 291 | 769 |
| Northern | 593 | 90 | 292 | 975 | 1,095 | 112 | 343 | 1,550 |
| Total Louisiana | 1,036 | 105 | 485 | 1,626 | 1,552 | 133 | 634 | 2,319 |
| Michigan | 312 | 55 | 402 | 769 | 355 | 30 | 435 | 820 |
| Mississippi | 319 | 29 | 143 | 491 | 250 | 16 | 161 | 427 |
| Montana | 152 | 93 | 64 | 309 | 191 | 69 | 85 | 845 |
| Nebraska, Missouri, Iowa | ------ | ------ | 7 | 7 | 18 | 3 | 35 | 56 |
| New Mexico | 423 | 60 | 79 | 562 | 433 | 44 | 129 | 606 |
| Oklahoma | 1,989 | 302 | 1,532 | 3,823 | 2,417 | 258 | 1,588 | 4,263 |
| Pennsylvania, New York, Ohio, West Virginia | 2,836 | 1,435 | 685 | 4,956 | 2,834 | 1,170 | 707 | 4,711 |
| Texas: | | | | | | | | |
| Gulf Coast | 909 | 111 | 479 | 1,499 | 1,057 | 133 | 688 | 1,878 |
| West Texas | 1,973 | 21 | 293 | 2,287 | 2,756 | 31 | 464 | 3,251 |
| East Texas | 313 | 77 | 206 | 596 | 339 | 77 | 213 | 629 |
| Other districts | 2,617 | 328 | 1,956 | 4,901 | 3,467 | 301 | 2,646 | 6,414 |
| Total Texas | 5,812 | 537 | 2,934 | 9,283 | 7,619 | 542 | 4,011 | 12,172 |
| Wyoming | 172 | 19 | 76 | 267 | 394 | 7 | 183 | 584 |
| Other States | 12 | 1 | 75 | 88 | 20 | 5 | 105 | 130 |
| Total United States | 17,999 | 3,305 | 9,538 | 30,842 | 22,585 | 2,897 | 12,026 | 37,508 |

TABLE H–22.—*Crude production, proved reserves and discoveries, 1918–49*

| Year | Crude oil production (thousand barrels) | | Proved crude oil reserves Dec. 31 (million barrels) | Withdrawal rate percent of reserves on Jan. 1 | New discoveries and revisions (million barrels) |
|---|---|---|---|---|---|
| | Annually (1) | Daily (2) | (3) | (4) | (5) |
| 1918 | 355,928 | 975 | 6,200 | | |
| 1919 | 378,367 | 1,037 | 6,700 | 6.1 | 878 |
| 1920 | 442,929 | 1,210 | 7,200 | 6.6 | 943 |
| 1921 | 472,183 | 1,294 | 7,800 | 6.6 | 1,072 |
| 1922 | 557,531 | 1,528 | 7,600 | 7.1 | 358 |
| 1923 | 732,407 | 2,007 | 7,600 | 9.6 | 732 |
| 1924 | 713,940 | 1,951 | 7,500 | 9.4 | 614 |
| 1925 | 763,743 | 2,092 | 8,500 | 10.2 | 1,764 |
| 1926 | 770,874 | 2,112 | 8,800 | 9.1 | 1,071 |
| 1927 | 901,129 | 2,469 | 10,500 | 10.2 | 2,601 |
| 1928 | 901,474 | 2,463 | 11,000 | 8.6 | 1,401 |
| 1929 | 1,007,323 | 2,760 | 15,200 | 9.2 | 3,207 |
| 1930 | 898,011 | 2,460 | 13,600 | 6.8 | 1,298 |
| 1931 | 851,081 | 2,332 | 13,000 | 6.3 | 252 |
| 1932 | 785,159 | 2,145 | 12,300 | 6.0 | 85 |
| 1933 | 905,656 | 2,481 | 12,000 | 7.4 | 605 |
| 1934 | 908,065 | 2,488 | 12,177 | 7.6 | 1,085 |
| 1935 | 996,596 | 2,730 | 12,400 | 8.2 | 1,220 |
| 1936 | 1,099,687 | 3,005 | 13,063 | 8.1 | 1,763 |
| 1937 | 1,279,160 | 3,505 | 15,507 | 9.7 | 3,723 |
| 1938 | 1,214,355 | 3,327 | 17,348 | 7.8 | 3,055 |
| 1939 | 1,264,962 | 3,466 | 18,483 | 7.3 | 2,400 |
| 1940 | 1,353,214 | 3,697 | 19,025 | 7.3 | 1,895 |
| 1941 | 1,402,228 | 3,842 | 19,589 | 7.4 | 1,967 |
| 1942 | 1,386,645 | 3,799 | 20,083 | 7.1 | 1,880 |
| 1943 | 1,505,613 | 4,125 | 20,064 | 7.5 | 1,487 |
| 1944 | 1,677,904 | 4,584 | 20,453 | 8.4 | 2,067 |
| 1945 | 1,713,655 | 4,695 | 20,827 | 8.4 | 2,087 |
| 1946 | 1,733,939 | 4,751 | 20,874 | 8.3 | 1,781 |
| 1947 | 1,856,987 | 5,088 | 21,488 | 8.9 | 2,471 |
| 1948 | 2,016,282 | 5,509 | 23,280 | 9.4 | 3,809 |
| 1949 | [1] 1,846,000 | [1] 5,058 | | 7.9 | |

[1] Based on Bureau of Mines release of Jan. 1, 1950.

Source: Columns 1, 2, 3, 5, and 6, Petroleum Industry Record, 1918–48, Oil Industry Information Committee; column 4, calculated annual production divided by reserves on Jan. 1.

TABLE H–23.—*Number of producing gas wells drilled, by State, 1935–48*

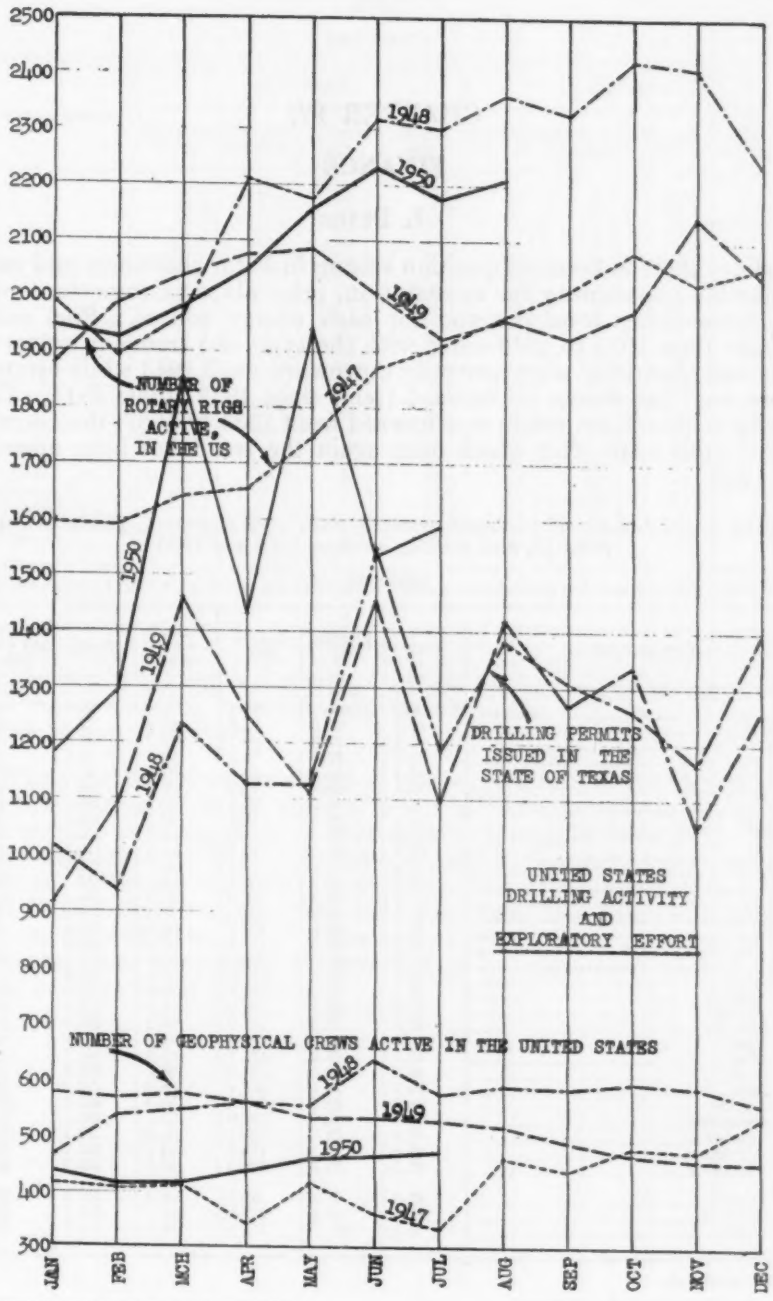
| State | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| United States | 1,401 | 2,070 | 2,834 | 2,236 | 2,145 | 2,382 | 2,911 | 2,597 | 2,290 | 3,069 | 3,235 | 3,090 | 3,353 | 2,897 |
| Arkansas | 2 | 5 | 6 | 3 | 6 | 13 | 20 | 7 | 3 | 2 | 0 | 2 | 10 | 5 |
| California | 34 | 12 | 17 | 7 | 15 | 15 | 23 | 25 | 38 | 50 | 56 | 65 | 45 | 21 |
| Colorado | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 7 | 10 |
| Illinois | 0 | 0 | 3 | 23 | 18 | 15 | 13 | 14 | 12 | 6 | 1 | 6 | 9 | 11 |
| Indiana | 74 | 59 | 39 | 43 | 44 | 77 | 56 | 21 | 19 | 28 | 28 | 25 | 35 | 40 |
| Kansas | 39 | 61 | 357 | 200 | 150 | 130 | 102 | 88 | 43 | 93 | 201 | 300 | 400 | 382 |
| Kentucky | 16 | 10 | 193 | 91 | 110 | 128 | 255 | 210 | 210 | 305 | 221 | 139 | 110 | 151 |
| Louisiana | 104 | 134 | 148 | 126 | 98 | 99 | 111 | 88 | 72 | 82 | 108 | 115 | 105 | 133 |
| Michigan | 103 | 212 | 69 | 28 | 52 | 59 | 97 | 74 | 47 | 64 | 54 | 107 | 150 | 30 |
| Mississippi | 3 | 4 | 3 | 6 | 1 | 1 | 4 | 1 | 0 | 1 | 8 | 6 | 29 | 16 |
| Missouri | 0 | 0 | 49 | 60 | 15 | 30 | 18 | 7 | 5 | 5 | 4 | 0 | 2 | 3 |
| Montana | 17 | 34 | 26 | 21 | 26 | 49 | 59 | 69 | 51 | 81 | 49 | 71 | 93 | 69 |
| New Mexico | 4 | 17 | 27 | 19 | 18 | 19 | 19 | 15 | 8 | 9 | 21 | 42 | 63 | 44 |
| New York | (1) | (1) | (1) | (1) | (1) | 20 | 18 | 26 | 10 | 5 | 7 | 8 | 10 | 0 |
| Ohio | 245 | 409 | 497 | 433 | 497 | 491 | 701 | 471 | 455 | 480 | 404 | 543 | 580 | 407 |
| Oklahoma | 110 | 126 | 123 | 160 | 151 | 176 | 159 | 102 | 112 | 212 | 250 | 341 | 269 | 258 |
| Pennsylvania | [1] 61 | [1] 131 | [1] 186 | [1] 166 | [1] 200 | 273 | 386 | 595 | 583 | 725 | 520 | 271 | 270 | 228 |
| Texas | 276 | 388 | 425 | 341 | 314 | 289 | 294 | 238 | 140 | 270 | 714 | 499 | 537 | 542 |
| West Virginia | 304 | 458 | 650 | 484 | 419 | 487 | 558 | 536 | 475 | 640 | 577 | 535 | 610 | 535 |
| Wyoming | 6 | 8 | 12 | 19 | 10 | 8 | 8 | 6 | 5 | 7 | 10 | 11 | 19 | 7 |
| Other States | 2 | 1 | 2 | 5 | 0 | 2 | 6 | 3 | 1 | 3 | 1 | 3 | 0 | 5 |

[1] New York included in Pennsylvania.

NOTE.—Data pertain only to dry gas and condensate wells.

Source: U. S. Bureau of Mines from Oil and Gas Journal and State sources.

FIGURE H–12.




Source: Interstate Compact Commission.

# CHAPTER IV.

## FINANCE

### I. PRICE

Since there is keen competition among fuels for customers and considerable opportunity for substitution, price plays an important role in determining total demand for each energy source. Fuel price trends from 1932 to 1949 differ with the type; the trends in prices of gas and electricity were generally downward until 1943 while bituminous coal has shown an upward trend since 1932 (table J–1). The trend of petroleum prices was upward from 1933 to 1937, then downward until 1940 after which once again the trend has been upward to 1948.

TABLE J–1.—*Indexes of wholesale prices of fuels and electricity, yearly averages 1932–49, and monthly averages 1949 and 1950*

[1926=100]

| Year and month | Gas | Electricity | Anthracite | Bituminous coal | Coke | Petroleum and products |
|---|---|---|---|---|---|---|
| 1932 | 101.3 | 104.7 | 88.4 | 82.0 | 77.7 | 45.4 |
| 1933 | 97.5 | 94.3 | 82.2 | 82.8 | 77.9 | 41.0 |
| 1934 | 93.4 | 91.8 | 80.1 | 94.5 | 84.8 | 50.5 |
| 1935 | 89.3 | 87.8 | 79.7 | 96.7 | 88.6 | 51.3 |
| 1936 | 85.2 | 83.4 | 80.5 | 97.4 | 94.7 | 57.3 |
| 1937 | 82.4 | 80.4 | 77.8 | 98.6 | 103.1 | 60.5 |
| 1938 | 86.1 | 84.9 | 78.0 | 99.0 | 104.8 | 55.9 |
| 1939 | 84.1 | 78.6 | 75.8 | 97.5 | 105.6 | 52.2 |
| 1940 | 82.0 | 74.5 | 78.9 | 97.6 | 110.2 | 50.0 |
| 1941 | 78.6 | 68.3 | 82.7 | 104.3 | 119.3 | 57.0 |
| 1942 | 78.4 | 63.8 | 85.5 | 109.7 | 122.1 | 59.8 |
| 1943 | 76.5 | 59.5 | 90.4 | 116.1 | 122.7 | 62.5 |
| 1944 | 77.2 | 59.6 | 95.6 | 120.3 | 130.3 | 63.9 |
| 1945 | 77.9 | 62.3 | 99.0 | 123.1 | 132.5 | 63.5 |
| 1946 | 80.7 | 66.6 | 109.0 | 132.5 | 140.4 | 67.5 |
| 1947 | 84.9 | 65.0 | 117.6 | 157.6 | 166.6 | 90.2 |
| 1948 | 89.2 | 66.3 | 130.3 | 187.0 | 207.1 | 122.1 |
| 1949 | 89.8 | 68.9 | 137.0 | 192.0 | 222.2 | 112.2 |
| January | 88.1 | 67.7 | 137.7 | 196.5 | 220.5 | 121.3 |
| February | 91.9 | 68.5 | 138.0 | 196.9 | 222.9 | 118.7 |
| March | 92.8 | 67.9 | 137.9 | 195.2 | 222.9 | 115.9 |
| April | 92.3 | 67.9 | 135.0 | 190.7 | 222.8 | 113.3 |
| May | 90.9 | 68.2 | 133.7 | 188.9 | 222.7 | 110.7 |
| June | 90.1 | 68.9 | 134.2 | 188.6 | 222.4 | 110.4 |
| July | 89.5 | 70.0 | 135.4 | 188.9 | 222.0 | 110.2 |
| August | 88.9 | 68.5 | 135.9 | 188.8 | 222.0 | 109.7 |
| September | 89.3 | 68.9 | 138.6 | 190.5 | 222.1 | 109.1 |
| October | 87.8 | 70.1 | 139.1 | 191.2 | 222.2 | 109.9 |
| November | 88.3 | 70.3 | 139.3 | 192.2 | 222.2 | 108.5 |
| December | 87.2 | 69.6 | 139.3 | 194.1 | 222.2 | 108.5 |
| 1950: | | | | | | |
| January | 85.0 | 68.9 | 139.3 | 196.2 | 222.2 | 109.4 |
| February | 87.4 | 69.6 | 139.3 | 196.7 | 223.7 | 109.4 |
| March | 88.3 | (1) | 141.9 | 198.0 | 224.7 | 108.6 |

[1] Not available.

Source: Bureau of Labor Statistics.

TABLE J–2.—*Indexes of net monthly retail gas bills, December 1932–49 and March 1950*

[1923–25=100]

| Year and month | 10.6 therms | | | | 30.6 therms | | | |
|---|---|---|---|---|---|---|---|---|
| | All types of gas | Manufactured gas | Natural gas | Mixed gas | All types of gas | Manufactured gas | Natural gas | Mixed gas |
| 1932 | 97.4 | 99.3 | 119.2 | 98.1 | 89.7 | 92.8 | 108.3 | 97.5 |
| 1933 | 97.2 | 99.2 | 118.8 | 97.7 | 88.4 | 92.1 | 107.9 | 92.2 |
| 1934 | 97.4 | 100.1 | 115.0 | 98.3 | 88.5 | 92.7 | 104.5 | 92.9 |
| 1935 | 97.2 | 100.0 | 114.1 | 98.3 | 86.8 | 90.4 | 104.0 | 92.4 |
| 1936 | 96.7 | 99.8 | 112.9 | 98.3 | 85.5 | 90.0 | 101.4 | 92.2 |
| 1937 | 96.8 | 100.0 | 112.7 | 98.4 | 85.1 | 89.4 | 101.2 | 92.4 |
| 1938 | 98.8 | 100.7 | 112.3 | 107.6 | 86.0 | 90.0 | 100.5 | 95.8 |
| 1939 | 99.8 | 101.4 | 116.0 | 107.4 | 85.9 | 89.7 | 102.9 | 94.0 |
| 1940 | 98.0 | 101.6 | 114.9 | 98.2 | 84.5 | 88.7 | 102.3 | 90.3 |
| 1941 | 97.2 | 100.7 | 113.2 | 98.1 | 83.6 | 87.9 | 99.2 | 90.2 |
| 1942 | 97.8 | 101.6 | 113.4 | 98.0 | 83.9 | 88.4 | 99.2 | 90.3 |
| 1943 | 96.7 | 101.7 | 109.8 | 94.8 | 81.6 | 88.5 | 97.4 | 77.9 |
| 1944 | [1] 95.4 | 101.8 | [1] 101.4 | 94.6 | [1] 80.3 | 88.5 | [1] 88.3 | 77.7 |
| 1945 | [1] 93.8 | 101.7 | [1] 91.4 | 94.5 | [1] 78.7 | 88.4 | [1] 77.4 | 77.5 |
| 1946 | 95.2 | 103.3 | 101.7 | 88.5 | 80.5 | 89.8 | 87.8 | 74.6 |
| 1947 | 98.7 | 109.6 | 98.5 | 89.7 | 83.5 | 95.4 | 84 4 | 75.1 |
| 1948 | 103.1 | 117.2 | 98.3 | 89.0 | 86.6 | 100.5 | 84.3 | 75.1 |
| 1949 | 110.1 | 130.0 | 98.4 | 88.4 | 91.0 | 107.5 | 84.7 | 76.0 |
| March | 109.2 | 129.0 | 98.0 | 87.4 | 90.7 | 107.3 | 84.6 | 75.6 |
| June | 110.1 | 130.8 | 97.7 | 87.4 | 91.1 | 108.2 | 84.1 | 75.6 |
| September | 110.4 | 130.3 | 98.1 | 89.3 | 91.1 | 107.6 | 84.5 | 76.4 |
| December | 110.5 | 129.8 | 99.8 | 89.3 | 90.9 | 107.0 | 85.4 | 76.4 |
| 1950: March | 109.6 | 130.0 | 98.6 | 86.5 | 90.0 | 107.2 | 82.6 | 74.6 |

[1] Index reflects a discount of 53 percent in December 1945, and 31 percent in December 1944, bills in one city.

NOTE.—It was assumed by the BLS for statistical purposes that 10.6 therms represent average monthly gas consumption for range use, and that 30.6 therms represent average monthly gas consumption for range and automatic water heater use. Data were collected for 50 cities for ther period prior to July 1947; since that time information has been collected for 34 cities. In December 1949, 16 cities were classified as receiving manufactured gas, 16 cities natural gas, and 2 cities mixed gas. As of March 1950, 15 cities were classified as receiving manufactured gas, 17 cities natural gas, and 2 cities mixed gas.

Source: Bureau of Labor Statistics.

When fuel oil prices are stated in coal equivalents of 3.9 barrels per ton and compared to the price of a ton of bituminous coal, the price relationship between these competing fuels is seen in table J–3. The price advantage which heavily favored coal in the early 1920's ended in 1928. Between 1928 and 1940 coal had the advantage only in 1934 and 1937. However, between 1941 and 1949 this price advantage was on the side of coal in all years except 1946. Since 1949 this price advantage has apparently favored fuel oil but data through October 1950 indicate rising fuel prices.

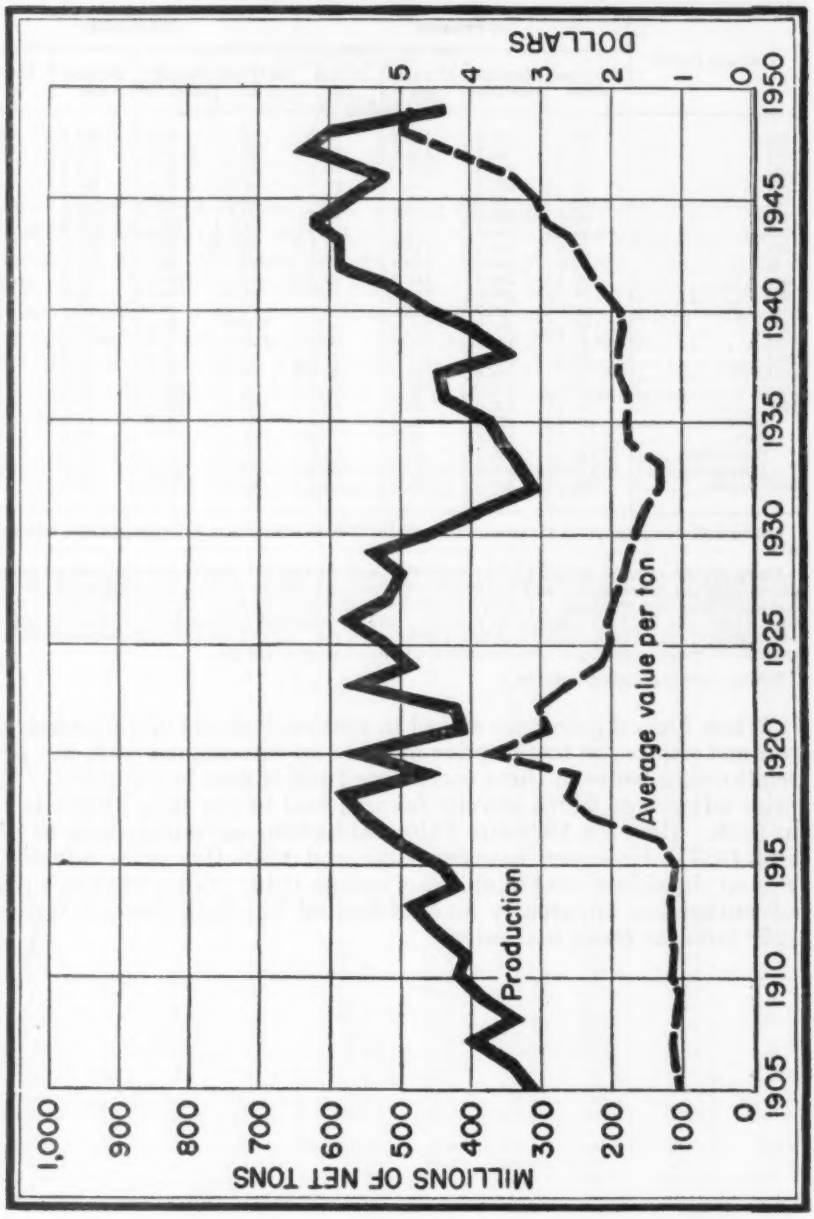



FIGURE J–1.—TRENDS OF BITUMINOUS-COAL AND LIGNITE PRODUCTION AND REALIZATION, 1905–49.

TABLE J–3.—*Average prices of No. 6 fuel oil and bituminous coal screenings (wholesale) at New York Harbor, 1923–49 and monthly January–October 1950, showing the fuel oil prices in coal equivalent 3.9 barrels per ton*

| Year | No. 6 fuel oil dollars per barrel | Fuel oil prices equivalent to 1 ton of coal at 3.9 barrels per ton | Prices per ton of bituminous coal screenings | Year | No. 6 fuel oil dollars per barrel | Fuel oil prices equivalent to 1 ton of coal at 3.9 barrels per ton | Prices per ton of bituminous coal screenings |
|---|---|---|---|---|---|---|---|
| 1923 | $1.70 | $6.63 | $5.56 | 1942 | 1.61 | 6.28 | 5.55 |
| 1924 | 1.73 | 6.75 | 4.84 | 1943 | 1.82 | 7.10 | 5.79 |
| 1925 | 1.74 | 6.79 | 4.49 | 1944 | 1.82 | 7.10 | 6.09 |
| 1926 | 1.74 | 6.79 | 4.69 | 1945 | 1.69 | 6.59 | 6.27 |
| 1927 | 1.64 | 6.40 | 4.70 | 1946 | 1.76 | 6.86 | 7.00 |
| 1928 | 1.19 | 4.64 | 4.65 | 1947 | 2.32 | 9.05 | 8.11 |
| 1929 | 1.05 | 4.10 | 4.60 | 1948 | 3.15 | 12.29 | 9.38 |
| 1930 | 1.09 | 4.25 | 4.55 | 1949 | 1.95 | 7.61 | 9.86 |
| 1931 | .84 | 3.28 | 4.41 | 1950: | | | |
| 1932 | .72 | 2.81 | 4.22 | January | 2.05 | 8.00 | 9.91 |
| 1933 | .89 | 3.47 | 4.18 | February | 2.05 | 8.00 | 9.91 |
| 1934 | 1.24 | 4.84 | 4.62 | March | 1.90 | 7.41 | 9.91 |
| 1935 | 1.07 | 4.17 | 4.85 | April | 2.00 | 7.80 | 9.29 |
| 1936 | 1.08 | 4.21 | 4.93 | May | 2.05 | 8.00 | 9.29 |
| 1937 | 1.29 | 5.03 | 4.97 | June | 2.05 | 8.00 | 9.29 |
| 1938 | 1.03 | 4.02 | 5.01 | July | 2.13 | 8.31 | 9.29 |
| 1939 | 1.04 | 4.06 | 5.11 | August | 2.15 | 8.39 | 9.29 |
| 1940 | 1.34 | 5.23 | 5.05 | September | 2.15 | 8.39 | 9.29 |
| 1941 | 1.34 | 5.23 | 5.24 | October | 2.15–[1]2.30 | 8.39–8.97 | ---- |

[1] Changed to $2.30 on October 7 by some suppliers.

The retail price structure of heating oil and coal is shown in 1948 by taking monthly prices of selected grades of coal and fuel oil in eight cities (J–4). Throughout that year heating oil prices were stable while coal prices showed a comparatively large spread (J–4).

The coal producer is of course directly affected by the value of production since this represents the price paid him at the mine. When expressed in average value per ton per year the upward trend from 1900 to the 1920 high can be seen; then the downward trend to the low of 1932; and finally the peak of 1920 was surpassed in 1947, with a still higher value set in 1948. This should be noted in connection with the income of bituminous coal mining corporations as shown in table J–10.

TABLE J–4.—*Retail prices of selected fuels in 1948, by cities and months* [1]

[Coal and coke, per net ton; heating oil, per 100 gallons]

| City and fuel | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baltimore, Md.: [2] | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | $17.86 | $17.95 | $17.95 | $17.95 | $18.01 | $18.30 | $19.02 | $20.11 | $20.14 | $20.14 | $20.14 | $20.14 |
| Buckwheat No. 1 | 13.41 | 13.53 | 13.53 | 13.53 | 13.66 | 13.69 | 14.02 | 14.48 | 14.48 | 14.48 | 14.48 | 14.48 |
| Heating oil: Fuel oil No. 2 | 12.17 | 12.17 | 12.17 | 11.83 | 11.73 | 11.73 | 11.73 | 11.73 | 12.04 | 12.14 | 12.14 | 12.14 |
| Boston, Mass.: | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | 19.88 | 20.25 | 20.25 | 20.25 | 20.31 | 20.44 | 20.82 | 21.80 | 21.80 | 21.95 | 21.95 | 21.95 |
| Buckwheat No. 1 | 14.95 | 15.25 | 15.25 | 15.25 | 15.31 | 15.44 | 15.62 | 16.00 | 16.00 | 16.15 | 16.15 | 16.15 |
| Coke, egg | 19.25 | 19.75 | 19.75 | 19.56 | 19.50 | 19.90 | 19.90 | 21.30 | 21.30 | 21.30 | 21.41 | 21.45 |
| Heating oil: Fuel oil No. 2 | 12.32 | 12.32 | 12.32 | 12.32 | 12.18 | 12.18 | 12.18 | 12.18 | 12.36 | 12.46 | 12.46 | 12.28 |
| Buffalo, N. Y.: [3] | | | | | | | | | | | | |
| Anthracite: Stove | 18.32 | 18.32 | 18.32 | 18.32 | 18.75 | 19.02 | 20.74 | 20.74 | 20.82 | 20.82 | 20.82 | 20.82 |
| Coke, nut | 16.01 | 16.61 | 16.61 | 16.61 | 17.27 | 17.93 | 19.14 | 19.14 | 19.64 | 19.64 | 19.64 | 19.64 |
| Heating oil: | | | | | | | | | | | | |
| Fuel oil No. 2 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 |
| Fuel oil No. 3 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 | 13.84 |
| Milwaukee, Wis.: | | | | | | | | | | | | |
| Anthracite: Stove | 20.05 | 20.05 | 20.05 | 20.05 | 20.40 | 20.40 | 20.95 | 22.10 | 22.10 | 22.10 | 22.10 | 22.10 |
| Bituminous coal, low-volatile stove | 17.45 | 17.45 | 17.45 | 17.45 | 18.50 | 19.02 | 19.02 | 19.33 | 19.50 | 19.50 | 19.50 | 19.50 |
| Coke, nut | 19.24 | 19.24 | 19.24 | 19.24 | 19.24 | 19.24 | 19.24 | 20.49 | 20.49 | 20.49 | 20.49 | 20.49 |
| Heating oil: | | | | | | | | | | | | |
| Fuel oil No. 2 | 14.44 | 14.68 | 14.48 | 14.18 | 14.10 | 14.22 | 14.34 | 14.34 | 14.22 | 14.22 | 14.10 | 14.10 |
| Fuel oil No. 3 | 14.60 | 14.90 | 14.65 | 14.28 | 14.15 | 14.30 | 14.45 | 14.45 | 14.30 | 14.28 | 14.15 | 14.15 |
| New York, N. Y.: [3] | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | 18.69 | 18.69 | 18.69 | 18.69 | 18.71 | 19.14 | 19.59 | 20.61 | 20.76 | 20.76 | 20.78 | 20.78 |
| Buckwheat No. 1 [4] | 12.81 | 12.81 | 12.81 | 12.80 | 12.82 | 12.90 | 13.07 | 13.45 | 13.59 | 13.59 | 13.59 | 13.59 |
| Coke, nut | 19.57 | 19.57 | 19.57 | 19.59 | 19.59 | 20.29 | 20.58 | 21.05 | 21.28 | 21.28 | 21.28 | 21.28 |
| Heating oil: Fuel oil No. 2 | 13.27 | 13.90 | 13.70 | 12.76 | 12.53 | 12.49 | 12.57 | 12.90 | 13.04 | 13.04 | 13.06 | 12.71 |
| Philadelphia, Pa.: | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | 17.95 | 17.95 | 17.95 | 17.95 | 17.95 | 18.18 | 18.18 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 |
| Buckwheat No. 1 | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 | 13.75 | 13.75 | 13.75 | 13.75 | 13.75 |
| Coke, nut | 18.38 | 18.25 | 18.25 | 18.25 | 18.25 | 19.25 | 19.25 | 20.25 | 20.25 | 20.25 | 20.25 | 20.25 |
| Heating oil: Fuel oil No. 2 | 11.76 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Portland, Maine: | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | 19.52 | 19.60 | 19.60 | 19.36 | 19.28 | 19.86 | 19.98 | 20.89 | 21.49 | 21.49 | 21.49 | 21.54 |
| Buckwheat No. 1 | 14.58 | 14.65 | 14.65 | 14.50 | 14.38 | 14.68 | 14.72 | 15.12 | 15.88 | 15.88 | 15.88 | 15.88 |
| Coke, egg | 18.87 | 18.93 | 18.93 | 18.69 | 18.59 | 19.05 | 19.24 | 20.16 | 20.78 | 20.63 | 20.63 | 20.63 |
| Heating oil: Fuel oil No. 2 | 12.28 | 12.28 | 12.28 | 11.54 | 11.54 | 11.54 | 11.56 | 11.76 | 12.30 | 12.36 | 12.46 | 12.30 |
| Washington, D. C.: | | | | | | | | | | | | |
| Anthracite: | | | | | | | | | | | | |
| Stove | 17.85 | 17.85 | 17.85 | 17.85 | 17.94 | 18.08 | 18.20 | 19.32 | 19.42 | 19.42 | 19.42 | 19.42 |
| Buckwheat No. 1 | 13.19 | 13.19 | 13.19 | 13.19 | 13.29 | 13.29 | 13.29 | 13.82 | 13.98 | 13.98 | 13.98 | 13.98 |
| Bituminous coal, low-volatile stove | 15.16 | 15.34 | 15.34 | 15.34 | 15.78 | 15.78 | 16.38 | 16.38 | 16.45 | 16.45 | 16.45 | 16.45 |
| Heating oil: Fuel oil No. 2 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | 12.30 |

[1] Compiled from reports of Bureau of Labor Statistics. Prices are as of the 15th of each month. Data are preliminary.
[2] Includes 2-percent sales tax.
[3] Includes 1-percent sales tax.
[4] Commercial.

Source: Minerals Yearbook, 1948.

TABLE J–5.— *Typical 250-kilowatt-hour residential electric monthly bills and average residential annual use, cities of 50,000 population and more*

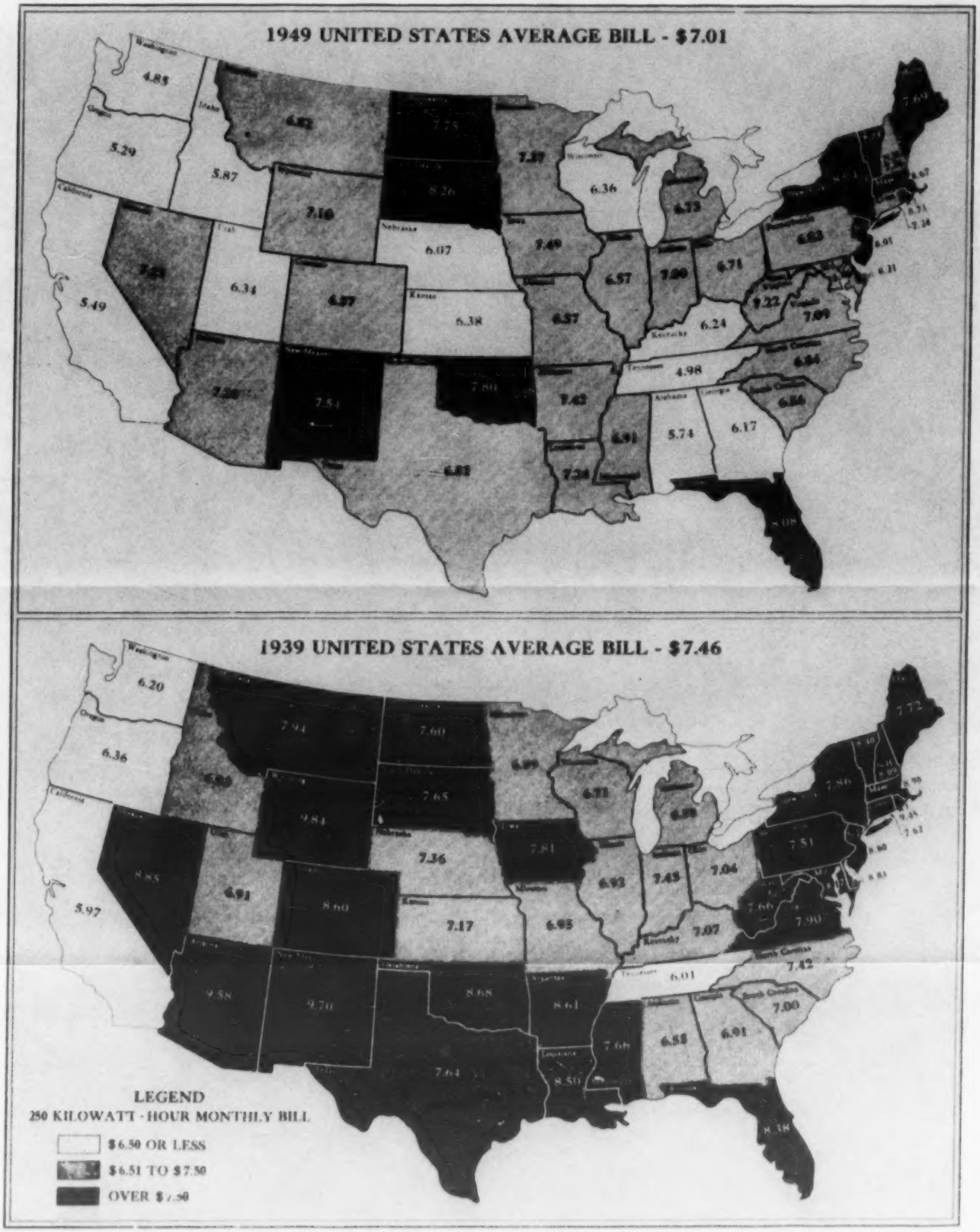
[State bill is an average for cities of 2,500 population and more]

| | Jan. 1, 1949, monthly bill | 1948—kilowatt-hour, annual use |
|---|---|---|
| United States | $7.01 | |
| Alabama | 5.74 | |
| Birmingham | 6.13 | 1,491 |
| Mobile | 5.60 | 2,068 |
| Montgomery | 5.60 | 2,065 |
| Arizona | 7.20 | |
| Phoenix | 6.53 | 1,793 |
| Arkansas | 7.42 | |
| Little Rock | 7.38 | 1,279 |
| California | 5.49 | |
| Berkeley | 5.02 | 1,447 |
| East Los Angeles | 6.04 | 985 |
| Fresno | 5.28 | 1,480 |
| *Glendale | 4.50 | **1,625 |
| Long Beach | 5.76 | 1,001 |
| *Los Angeles | 4.90 | 1,506 |
| Oakland | 5.02 | 1,246 |
| *Pasadena | 5.25 | 1,552 |
| *Sacramento | 5.28 | **1,850 |
| San Diego | 5.69 | 1,221 |
| San Francisco | 5.02 | 1,114 |
| San Jose | 5.28 | 1,196 |
| Santa Monica | 5.85 | 1,200 |
| Stockton | 5.28 | 1,263 |
| Colorado | 6.57 | |
| Denver | 6.00 | 1,285 |
| Pueblo | 8.07 | 1,481 |
| Connecticut | 7.24 | |
| Bridgeport | 6.88 | 1,144 |
| Hartford | 7.25 | 1,860 |
| New Britain | 7.25 | 1,778 |
| New Haven | 6.88 | 1,098 |
| Waterbury | 7.25 | 1,778 |
| Delaware | 8.21 | |
| Wilmington | 8.00 | 1,142 |
| District of Columbia | 5.44 | |
| Washington | 5.44 | 1,621 |
| Florida | 8.08 | |
| *Jacksonville | 7.60 | **2,240 |
| Miami | 8.19 | 2,006 |
| Saint Petersburg | 8.05 | 1,723 |
| Tampa | 6.75 | 1,666 |
| Georgia | 6.17 | |
| Atlanta | 5.85 | 1,958 |
| Augusta | 5.85 | 2,101 |
| Columbus | 5.85 | 1,772 |
| Macon | 5.85 | 1,418 |
| Savannah | 7.40 | 1,623 |
| Idaho | 5.87 | |
| Boise City [1] | 6.00 | 4,248 |
| Illinois | 6.57 | |
| Chicago | 6.35 | 1,300 |
| Cicero | 6.85 | 1,636 |
| Decatur | 7.02 | 1,527 |
| East Saint Louis | 5.94 | 1,251 |
| Evanston | 6.85 | 1,636 |
| Oak Park | 6.85 | 1,636 |
| Peoria | 5.70 | 1,637 |
| Rockford | 6.21 | 1,518 |
| Springfield | 5.22 | 1,756 |
| *Springfield | 4.80 | 2,416 |
| Indiana | 7.00 | |
| East Chicago | 7.45 | 1,035 |
| Evansville | 6.58 | 1,179 |
| *Fort Wayne [2] | 5.40 | 2,166 |
| Gary | 7.45 | 1,177 |
| Hammond | 7.45 | 1,211 |
| Indianapolis | 6.65 | 1,698 |
| South Bend | 7.15 | 1,902 |
| Terre Haute | 7.40 | 1,245 |
| Iowa | 7.49 | |
| Cedar Rapids | 7.50 | 1,484 |
| Davenport | 5.75 | 1,464 |
| Des Moines | 6.39 | 1,481 |
| Sioux City | 7.67 | 1,204 |
| Waterloo | 8.61 | 1,201 |
| Kansas | $6.38 | |
| *Kansas City | 4.95 | 1,542 |
| Topeka | 4.63 | 1,722 |
| Wichita | 5.00 | 1,457 |
| Kentucky | 6.24 | |
| Covington | 4.75 | 1,336 |
| Louisville | 5.75 | 1,413 |
| Louisiana | 7.24 | |
| Baton Rouge | 7.05 | 1,312 |
| New Orleans | 6.83 | 1,256 |
| Shreveport | 7.22 | 1,326 |
| Maine | 7.69 | |
| Portland | 7.70 | 1,331 |
| Maryland | 6.86 | |
| Baltimore | 6.74 | 1,290 |
| Massachusetts | 8.67 | |
| Boston | 9.61 | 891 |
| Brockton | 9.10 | 1,357 |
| Cambridge | 6.15 | 1,020 |
| Fall River | 8.50 | 733 |
| *Holyoke | 6.75 | 926 |
| Lawrence | 9.13 | 691 |
| Lowell | 9.16 | 800 |
| Lynn | 8.09 | 816 |
| Malden | 8.50 | 985 |
| Medford | 8.50 | 1,063 |
| New Bedford | 7.46 | 744 |
| Newton | 9.61 | 1,698 |
| Quincy | 7.60 | 1,000 |
| Somerville | 9.61 | 922 |
| Springfield | 7.34 | 1,305 |
| Worcester | 7.57 | 1,209 |
| Michigan | 6.73 | |
| Dearborn | 7.01 | 1,606 |
| Detroit | 7.01 | 1,453 |
| Flint | 5.95 | 1,860 |
| Grand Rapids | 5.95 | 1,448 |
| Highland Park | 7.01 | 1,528 |
| Kalamazoo | 5.95 | 1,901 |
| *Kalamazoo | 5.75 | 2,317 |
| *Lansing | 4.90 | 2,451 |
| Pontiac | 7.01 | 1,646 |
| Saginaw | 5.95 | 1,534 |
| Minnesota | 7.37 | |
| Duluth | 7.17 | 1,415 |
| Minneapolis | 7.36 | 1,603 |
| Saint Paul | 7.75 | 1,390 |
| Mississippi | 6.91 | |
| Jackson | 7.56 | 1,185 |
| Missouri | 6.57 | |
| Kansas City | 7.00 | 1,512 |
| Saint Joseph | 6.65 | 1,317 |
| Saint Louis | 5.94 | 1,388 |
| *Springfield | 6.50 | 1,220 |
| Montana | 6.82 | |
| Butte [1] | 6.83 | 1,135 |
| Nebraska | 6.07 | |
| *Lincoln [4] | 4.40 | **1,620 |
| *Omaha | 6.47 | **1,650 |
| Nevada | 7.25 | |
| Reno [1] | 7.51 | 3,090 |
| New Hampshire | 7.36 | |
| Manchester | 7.16 | 1,146 |
| New Jersey | 8.01 | |
| Atlantic City | 8.40 | 1,014 |
| Bayonne | 7.95 | 944 |
| Camden | 7.95 | 1,237 |
| East Orange | 7.95 | 1,243 |
| Elizabeth | 7.95 | 1,180 |
| Hoboken | 7.95 | 896 |
| Irvington | 7.95 | 979 |
| Jersey City | 7.95 | 861 |
| Newark | 7.95 | 979 |
| Passaic | 7.95 | 990 |
| Paterson | 7.95 | 1,041 |
| Trenton | 7.95 | 1,224 |

See footnotes at end of table.

FIGURE J–2.—STATE AVERAGE BILLS, 250 KILOWATT-HOURS RESIDENTIAL ELECTRIC SERVICE, CITIES OF 2,500 POPULATION AND MORE, 1949 AND 1939.

FIGURE J–2.—STATE AVERAGE BILLS, 250 KILOWATT-HOURS RESIDENTIAL ELECTRIC SERVICE, CITIES OF 2,500 POPULATION AND MORE, 1949 AND 1939.

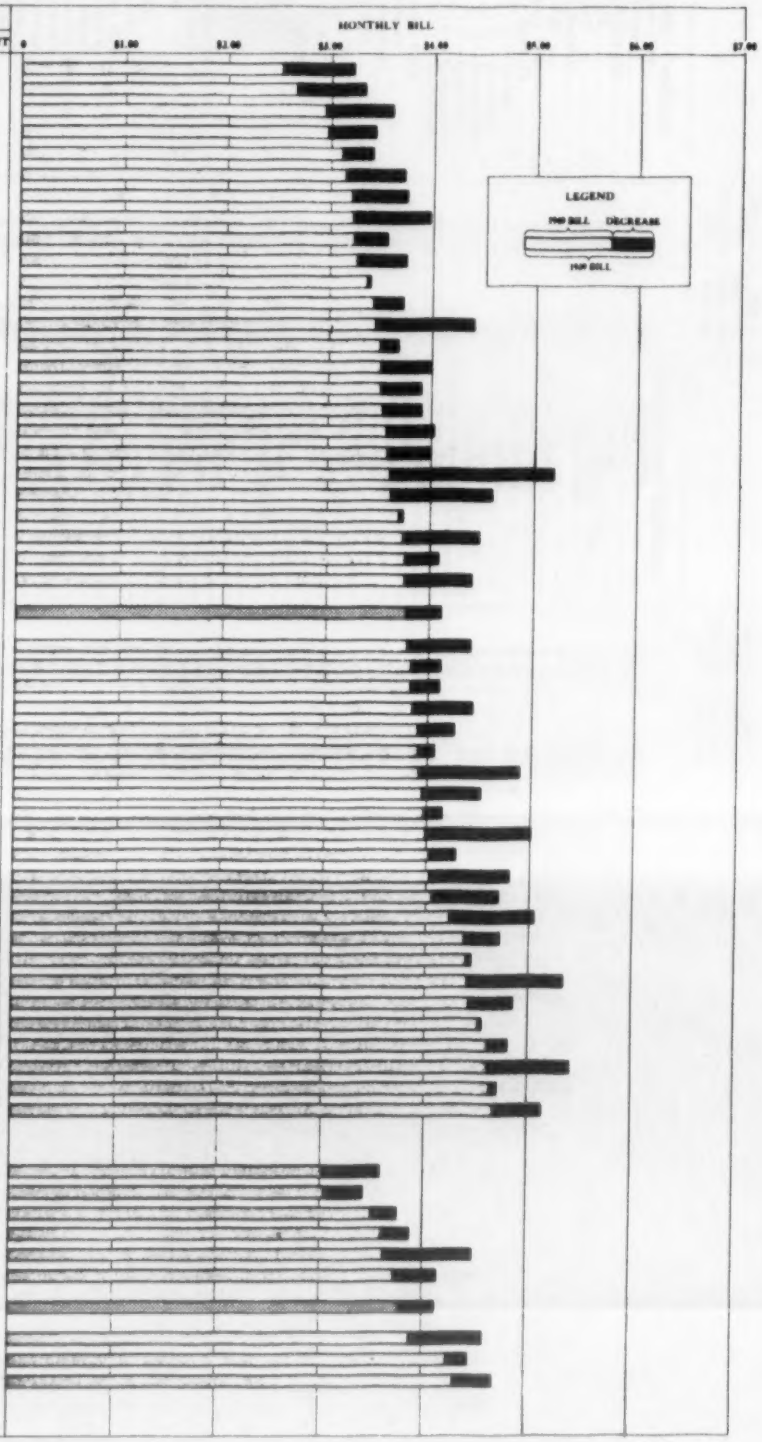



Source: Federal Power Commission.

FIGURE J-3.—STATE AVERAGE BILLS, 100 KILOWATT-HOURS RESIDENTIAL ELECTRIC SERVICE, CITIES OF 2,500 POPULATION AND MORE, 1939 AND 1949.

FIGURE J-3.—STATE AVERAGE BILLS, 100 KILOWATT-HOURS RESIDENTIAL ELECTRIC SERVICE, CITIES OF 2,500 POPULATION AND MORE, 1939 AND 1949.

| RANK | | STATE | MONTHLY BILL | | DECREASE | |
|---|---|---|---|---|---|---|
| 1949 | 1939 | | 1949 | 1939 | AMOUNT | PERCENT |
| 1 | 1 | TENNESSEE | $ 3.53 | $ 3.23 | $ .70 | 21.7 |
| 2 | 2 | WASHINGTON | 3.66 | 3.33 | .67 | 20.1 |
| 3 | 7 | OREGON | 3.94 | 3.60 | .66 | 18.3 |
| 4 | 5 | ALABAMA | 3.97 | 3.43 | .46 | 13.4 |
| 5 | 4 | CALIFORNIA | 3.11 | 3.41 | .30 | 8.8 |
| 6 | 9 | UTAH | 3.15 | 3.72 | .57 | 15.3 |
| 7 | 13 | KENTUCKY | 3.21 | 3.75 | .54 | 14.4 |
| 8 | 15 | NEBRASKA | 3.22 | 3.97 | .75 | 18.9 |
| 9 | 6 | MISSOURI | 3.23 | 3.56 | .33 | 9.3 |
| 10 | 11 | IDAHO | 3.26 | 3.74 | .48 | 12.8 |
| 10 | 3 | MICHIGAN | 3.58 | 3.60 | .04 | 1.1 |
| 12 | 9 | WISCONSIN | 3.43 | 3.72 | .29 | 7.8 |
| 13 | 27 | NEVADA | 3.45 | 4.41 | .96 | 21.8 |
| 14 | 8 | OHIO | 3.50 | 3.68 | .18 | 4.9 |
| 15 | 17 | MARYLAND | 3.51 | 3.99 | .48 | 12.0 |
| 15 | 14 | SOUTH CAROLINA | 3.51 | 3.90 | .39 | 10.0 |
| 17 | 19 | ILLINOIS | 3.53 | 3.91 | .38 | 9.7 |
| 18 | 16 | GEORGIA | 3.57 | 4.03 | .46 | 11.4 |
| 19 | 17 | NORTH CAROLINA | 3.58 | 3.99 | .41 | 10.3 |
| 20 | 45 | ARIZONA | 3.61 | 5.20 | 1.59 | 30.6 |
| 21 | 35 | COLORADO | 3.62 | 4.60 | .98 | 21.3 |
| 22 | 11 | MINNESOTA | 3.70 | 3.74 | .04 | 1.1 |
| 23 | 32 | VIRGINIA | 3.74 | 4.48 | .74 | 16.5 |
| 24 | 21 | INDIANA | 3.76 | 4.09 | .33 | 8.1 |
| 24 | 27 | TEXAS | 3.76 | 4.41 | .65 | 14.7 |
| | | UNITED STATES | 3.79 | 4.13 | .34 | 8.3 |
| 26 | 27 | MONTANA | 3.79 | 4.41 | .62 | 14.1 |
| 27 | 23 | KANSAS | 3.83 | 4.13 | .29 | 7.0 |
| 27 | 22 | CONNECTICUT | 3.83 | 4.11 | .28 | 6.8 |
| 29 | 30 | MISSISSIPPI | 3.85 | 4.44 | .59 | 13.3 |
| 30 | 25 | PENNSYLVANIA | 3.90 | 4.28 | .38 | 8.9 |
| 31 | 20 | WEST VIRGINIA | 3.91 | 4.07 | .16 | 3.9 |
| 32 | 42 | ARKANSAS | 3.92 | 4.90 | .98 | 20.0 |
| 33 | 53 | NEW JERSEY | 3.95 | 4.52 | .57 | 12.6 |
| 34 | 24 | NORTH DAKOTA | 3.97 | 4.15 | .18 | 4.3 |
| 35 | 43 | WYOMING | 3.99 | 5.01 | 1.02 | 20.4 |
| 36 | 26 | IOWA | 4.03 | 4.30 | .27 | 6.3 |
| 37 | 30 | LOUISIANA | 4.05 | 4.81 | .76 | 15.8 |
| 38 | 50 | OKLAHOMA | 4.06 | 4.71 | .65 | 13.8 |
| 39 | 44 | NEW HAMPSHIRE | 4.83 | 5.05 | .82 | 16.2 |
| 40 | 38 | MASSACHUSETTS | 4.36 | 4.70 | .34 | 7.2 |
| 41 | 31 | SOUTH DAKOTA | 4.40 | 4.45 | .05 | 1.1 |
| 42 | 47 | NEW MEXICO | 4.41 | 5.34 | .93 | 17.4 |
| 43 | 41 | VERMONT | 4.43 | 4.88 | .45 | 9.2 |
| 44 | 34 | NEW YORK | 4.52 | 4.56 | .04 | 0.9 |
| 45 | 39 | DELAWARE | 4.61 | 4.81 | .20 | 4.2 |
| 45 | 48 | RHODE ISLAND | 4.61 | 5.41 | .80 | 14.8 |
| 47 | 36 | MAINE | 4.64 | 4.71 | .07 | 1.5 |
| 48 | 45 | FLORIDA | 4.67 | 5.14 | .47 | 9.1 |
| | | GEOGRAPHIC DIVISION | | | | |
| 1 | 2 | EAST SOUTH CENTRAL | 3.01 | 3.68 | .67 | 18.2 |
| 2 | 1 | PACIFIC | 3.04 | 3.42 | .38 | 11.1 |
| 3 | 3 | EAST NORTH CENTRAL | 3.80 | 3.75 | .25 | 6.7 |
| 4 | 4 | WEST NORTH CENTRAL | 3.80 | 3.97 | .27 | 7.0 |
| 5 | 7 | MOUNTAIN | 3.82 | 4.48 | .66 | 14.3 |
| 6 | 5 | SOUTH ATLANTIC | 3.72 | 4.14 | .42 | 10.1 |
| | | UNITED STATES | 3.79 | 4.13 | .34 | 8.3 |
| 7 | 8 | WEST SOUTH CENTRAL | 3.86 | 4.50 | .71 | 15.8 |
| 8 | 6 | MIDDLE ATLANTIC | 4.24 | 4.45 | .21 | 4.7 |
| 9 | 9 | NEW ENGLAND | 4.51 | 4.89 | .38 | 8.1 |




Source: Federal Power Commission.

TABLE J–5.— *Typical 250-kilowatt-hour residential electric monthly bills and average residential annual use, cities of 50,000 population and more*—Continued

| | Jan. 1, 1949, monthly bill | 1948—kilowatt-hour, annual use |
|---|---|---|
| New Jersey—Continued | | |
| Union City | $7.95 | 896 |
| New Mexico | 7.54 | |
| Albuquerque [1] | 6.41 | 1,133 |
| New York | 8.04 | |
| Albany | 6.69 | 1,190 |
| Binghamton | 6.86 | 1,427 |
| Buffalo | 5.03 | 1,475 |
| Mount Vernon | 8.60 | 1,041 |
| New Rochelle | 8.60 | 1,275 |
| N. Y. C.—Bronx [3] | 8.71 | 938 |
| N. Y. C.—Brooklyn | 8.71 | 938 |
| N. Y. C.—Manhattan | 8.71 | 938 |
| N. Y. C.—Queens [3 5] | 8.71 | 938 |
| N. Y. C.—Queens [3 6] | 7.41 | 1,318 |
| N. Y. C.—Richmond | 7.26 | 1,318 |
| Niagara Falls | 5.03 | 4,661 |
| Rochester | 6.86 | 1,116 |
| Schenectady | 6.69 | 1,231 |
| Syracuse | 6.69 | 1,198 |
| Troy | 6.69 | 1,105 |
| Utica | 6.69 | 1,048 |
| Yonkers | 8.60 | 978 |
| North Carolina | 6.84 | |
| Asheville | 6.75 | 2,018 |
| Charlotte | 6.20 | 2,279 |
| Durham | 6.20 | 1,880 |
| Greensboro | 6.20 | 1,914 |
| Raleigh | 6.75 | 2,677 |
| Winston-Salem | 6.20 | 1,762 |
| North Dakota | 7.75 | |
| Fargo [1] | 7.75 | 1,661 |
| Ohio | 6.71 | |
| Akron | 5.68 | 1,763 |
| Canton | 7.15 | 1,748 |
| Cincannati | 5.90 | 1,377 |
| Cleveland | 6.73 | 1,641 |
| *Cleveland | 5.40 | 1,291 |
| Cleveland Heights | 6.73 | 1,641 |
| Columbus | 7.83 | 1,248 |
| *Columbus | 6.25 | **1,375 |
| Dayton | 7.19 | 1,390 |
| Hamilton | 6.12 | 2,021 |
| *Hamilton | 5.46 | 1,117 |
| Lakewood | 6.73 | 1,641 |
| Springfield | 6.70 | 1,333 |
| Toledo | 6.50 | 1,488 |
| Youngstown | 5.68 | 1,592 |
| Oklahoma | 7.80 | |
| Oklahoma City | 6.97 | 1,200 |
| Tulsa | 7.69 | 1,457 |
| Oregon | 5.29 | |
| Portland [3] | 5.12 | 4,184 |
| Pennsylvania | 6.83 | |
| Allentown | 8.24 | 1,416 |
| Altoona | 7.65 | 1,381 |
| Bethlehem | 8.24 | 1,550 |
| Chester | 6.79 | 1,548 |
| Erie | 7.65 | 1,381 |
| Harrisburg | 8.24 | 1,340 |
| Johnstown | 7.65 | 1,381 |
| Lancaster | 8.24 | 1,636 |
| McKeesport | 6.35 | 1,512 |
| Philadelphia | 5.85 | 1,548 |
| Pennsylvania—Continued | | |
| Pittsburgh | $6.35 | 1,512 |
| Reading | 6.90 | 1,501 |
| Scranton | 7.10 | 1,102 |
| Upper Darby Twp | 6.79 | 1,548 |
| Wilkes-Barre | 8.24 | 1,019 |
| York | 6.65 | 1,823 |
| Rhode Island | 8.73 | |
| Pawtucket | 8.51 | 881 |
| Providence | 8.85 | 837 |
| South Carolina | 6.56 | |
| Charleston | 6.67 | 1,769 |
| Columbia | 7.05 | 1,817 |
| South Dakota | 8.26 | |
| Sioux Falls [1] | 7.75 | 1,564 |
| *Sioux Falls [1] | 6.75 | 1,363 |
| Tennessee | 4.98 | |
| *Chattanooga | 5.00 | 3,906 |
| *Knoxville | 5.00 | 3,535 |
| *Memphis | 5.00 | 1,585 |
| *Nashville | 5.00 | 3,980 |
| Texas | 6.82 | |
| Amarillo | 6.48 | 1,242 |
| *Austin | 6.30 | **1,185 |
| Beaumont | 7.05 | 1,529 |
| Corpus Christi | 7.46 | 1,154 |
| Dallas | 6.19 | 1,585 |
| El Paso | 6.75 | 1,431 |
| Fort Worth | 7.07 | 1,373 |
| Galveston | 5.60 | 1,328 |
| Houston | 5.60 | 1,508 |
| *San Antonio | 6.26 | 1,095 |
| Waco | 7.23 | 1,133 |
| Utah | 6.34 | |
| Salt Lake City | 6.35 | 2,207 |
| Vermont | 8.34 | |
| *Burlington [1 2] | 8.10 | **1,285 |
| Virginia | 7.09 | |
| Arlington County | 7.25 | 2,101 |
| Norfolk | 7.00 | 1,424 |
| Portsmouth | 7.00 | 1,485 |
| Richmond | 7.00 | 1,795 |
| Roanoke | 7.15 | 1,937 |
| Washington | 4.85 | |
| *Seattle [3] | 5.10 | 5,018 |
| Spokane | 4.38 | 4,970 |
| *Tacoma | 3.20 | 5,922 |
| West Virginia | 7.22 | |
| Charleston | 7.15 | 1,389 |
| Huntington | 7.15 | 1,226 |
| Wheeling | 7.15 | 1,341 |
| Wisconsin | 6.36 | |
| Madison | 4.65 | 2,214 |
| Milwaukee | 5.73 | 1,468 |
| Racine | 5.98 | 1,497 |
| Wyoming | 7.10 | |
| Cheyenne [1] | 6.20 | 1,661 |
| Hawaii: | | |
| Honolulu | 7.15 | |
| Puerto Rico: | | |
| *Mayaguez | 8.40 | |
| *Ponce | 8.40 | |
| *San Juan | 8.40 | |

[1] Largest city in State.
[2] Served by a privately and a publicly owned utility.
[3] Served by two privately owned utilities.
[4] Served by two publicly owned utilities.
[5] Data for majority of customers.
[6] Data for minority of customers.
*Publicly owned utility.
**Estimate based on data available.

For notes indicating inclusion of lamp renewals, service contract with Tennessee Valley Authority, details pertaining to competitive situations and related matters see the typical bill report.

76468—51——14

TABLE J–6.—*Production and value of production of the bituminous-coal and lignite-mining industry, 1890–1949*

| Year | Production (net tons) | Value of production [1] | | Men employed | Number of mines | Capacity at 280 days (million tons) |
|---|---|---|---|---|---|---|
| | | Total | Average per ton | | | |
| 1890 | 111,302,322 | $110,420,801 | $0.99 | 192,204 | [2] | 137 |
| 1891 | 117,901,238 | 117,188,400 | .99 | 205,803 | [2] | 148 |
| 1892 | 126,856,567 | 125,124,381 | .99 | 212,893 | [2] | 162 |
| 1893 | 128,385,231 | 122,751,618 | .96 | 230,365 | [2] | 174 |
| 1894 | 118,820,405 | 107,653,501 | .91 | 244,603 | [2] | 196 |
| 1895 | 135,118,193 | 115,779,771 | .86 | 239,962 | 2,555 | 196 |
| 1896 | 137,640,276 | 114,891,515 | .83 | 244,171 | 2,599 | 202 |
| 1897 | 147,617,519 | 119,595,224 | .81 | 247,817 | 2,454 | 213 |
| 1898 | 166,593,623 | 132,608,713 | .80 | 255,717 | 2,862 | 221 |
| 1899 | 193,323,187 | 167,952,104 | .87 | 271,027 | 3,245 | 230 |
| 1900 | 212,316,112 | 220,930,313 | 1.04 | 304,375 | [2] | 255 |
| 1901 | 225,828,149 | 236,422,049 | 1.05 | 340,235 | [2] | 281 |
| 1902 | 260,216,844 | 290,858,483 | 1.12 | 370,056 | [2] | 316 |
| 1903 | 282,749,348 | 351,687,933 | 1.24 | 415,777 | [2] | 350 |
| 1904 | 278,659,689 | 305,397,001 | 1.10 | 437,832 | 4,650 | 386 |
| 1905 | 315,062,785 | 334,658,294 | 1.06 | 460,629 | 5,060 | 417 |
| 1906 | 342,874,867 | 381,162,115 | 1.11 | 478,425 | 4,430 | 451 |
| 1907 | 394,759,112 | 451,214,842 | 1.14 | 513,258 | 4,550 | 473 |
| 1908 | 332,573,944 | 374,135,268 | 1.12 | 516,264 | 4,730 | 482 |
| 1909 | 379,744,257 | 405,486,777 | 1.07 | 543,152 | 5,775 | 510 |
| 1910 | 417,111,142 | 469,281,719 | 1.12 | 555,533 | 5,818 | 538 |
| 1911 | 405,907,059 | 451,375,819 | 1.11 | 549,775 | 5,887 | 538 |
| 1912 | 450,104,982 | 517,983,445 | 1.15 | 548,632 | 5,747 | 566 |
| 1913 | 478,435,297 | 565,234,952 | 1.18 | 571,882 | 5,776 | 577 |
| 1914 | 422,703,970 | 493,309,244 | 1.17 | 583,506 | 5,592 | 608 |
| 1915 | 442,624,426 | 502,037,688 | 1.13 | 557,456 | 5,502 | 610 |
| 1916 | 502,519,682 | 665,116,077 | 1.32 | 561,102 | 5,726 | 613 |
| 1917 | 551,790,563 | 1,249,272,837 | 2.26 | 603,143 | 6,939 | 636 |
| 1918 | 579,385,820 | 1,491,809,940 | 2.58 | 615,305 | 8,319 | 650 |
| 1919 | 465,860,058 | 1,160,616,013 | 2.49 | 621,998 | 8,994 | 669 |
| 1920 | 568,666,683 | 2,129,933,000 | 3.75 | 639,547 | 8,921 | 725 |
| 1921 | 415,921,950 | 1,199,983,600 | 2.89 | 663,754 | 8,038 | 781 |
| 1922 | 422,268,099 | 1,274,820,000 | 3.02 | 687,958 | 9,299 | 832 |
| 1923 | 564,564,662 | 1,514,621,000 | 2.68 | 704,793 | 9,331 | 885 |
| 1924 | 483,686,538 | 1,062,626,000 | 2.20 | 619,604 | 7,586 | 792 |
| 1925 | 520,052,741 | 1,060,402,000 | 2.04 | 588,493 | 7,144 | 748 |
| 1926 | 573,366,985 | 1,183,412,000 | 2.06 | 593,647 | 7,177 | 747 |
| 1927 | 517,763,352 | 1,029,657,000 | 1.99 | 593,918 | 7,011 | 759 |
| 1928 | 500,744,970 | 933,774,000 | 1.86 | 522,150 | 6,450 | 691 |
| 1929 | 534,988,593 | 952,781,000 | 1.78 | 502,993 | 6,057 | 679 |
| 1930 | 467,526,299 | 795,483,000 | 1.70 | 493,202 | 5,891 | 700 |
| 1931 | 382,089,396 | 588,895,000 | 1.54 | 450,213 | 5,642 | 669 |
| 1932 | 309,709,872 | 406,677,000 | 1.31 | 406,380 | 5,427 | 594 |
| 1933 | 333,630,533 | 445,788,000 | 1.34 | 418,703 | 5,555 | 559 |
| 1934 | 359,368,022 | 628,383,000 | 1.75 | 458,011 | 6,258 | 565 |
| 1935 | 372,373,122 | 658,063,000 | 1.77 | 462,403 | 6,315 | 582 |
| 1936 | 439,087,903 | 770,955,000 | 1.76 | 477,204 | 6,875 | 618 |
| 1937 | 445,531,449 | 864,042,000 | 1.94 | 491,864 | 6,548 | 646 |
| 1938 | 348,544,764 | 678,653,000 | 1.95 | 441,333 | 5,777 | 602 |
| 1939 | 394,855,325 | 728,348,366 | 1.84 | 421,788 | 5,820 | 621 |
| 1940 | 460,771,500 | 879,327,227 | 1.91 | 439,075 | 6,324 | 639 |
| 1941 | 514,149,245 | 1,125,362,836 | 2.19 | 456,981 | 6,822 | 666 |
| 1942 | 582,692,937 | 1,373,990,608 | 2.36 | 461,991 | 6,972 | 663 |
| 1943 | 590,177,069 | 1,584,644,477 | 2.69 | 416,007 | 6,620 | 626 |
| 1944 | 619,576,240 | 1,810,900,542 | 2.92 | 393,347 | 6,928 | 624 |
| 1945 | 577,617,327 | 1,768,204,320 | 3.06 | 383,100 | 7,033 | 620 |
| 1946 | 533,922,068 | 1,835,539,476 | 3.44 | [3] 396,434 | 7,333 | 699 |
| 1947 | 630,623,722 | 2,622,634,946 | 4.16 | [3] 419,182 | 8,700 | 755 |
| 1948 | 599,518,229 | 2,993,153,747 | 4.99 | [3] 441,631 | 9,079 | 774 |
| 1949 | 437,868,036 | 2,136,870,571 | 4.88 | ---------- | ---------- | ---------- |

[1] Figures for 1890 to 1936 and 1939 exclude selling expense. Figures for 1937–38 and 1940–49 include selling expense.
[2] Data not available.
[3] Average number of men working daily.

Crude oil prices at the well appear in general to follow the same trend as that described for coal prices. However the high of 1920 for crude oil was above the 1949 high (J–7).

Since crude oil must be refined for use, the spread between the price of crude and its principal products indicates the margin within which the refiner must operate to show a profit (J–8). The widest spread was reached in 1948 but this was sharply narrowed in 1949 (J–8). This spread is only an indication, since there are only four products used and they are not weighted according to the relation of the percentage that each product bears to the total. Another factor to be considered is the ownership of crude oil by some of the large integrated companies with the possibilities which that provides of operating on narrower spreads.

TABLE J–7.—*Prices of crude oil*

| Year | Average price at well per barrel [1] | Wholesale price index (1935–39 equals 100) [2] | Year | Average price at well per barrel [1] | Wholesale price index (1935–39 equals 100) [2] |
|---|---|---|---|---|---|
| 1918 | $1.98 | 162.9 | 1934 | $1.00 | 92.9 |
| 1919 | 2.01 | 172.0 | 1935 | 0.97 | 99.3 |
| 1920 | 3.07 | 191.2 | 1936 | 1.09 | 100.2 |
| 1921 | 1.73 | 121.1 | 1937 | 1.18 | 107.1 |
| 1922 | 1.61 | 120.0 | 1938 | 1.13 | 97.5 |
| 1923 | 1.34 | 124.8 | 1939 | 1.02 | 95.7 |
| 1924 | 1.43 | 121.7 | 1940 | 1.02 | 97.5 |
| 1925 | 1.68 | 128.4 | 1941 | 1.14 | 108.3 |
| 1926 | 1.88 | 124.1 | 1942 | 1.19 | 122.6 |
| 1927 | 1.30 | 118.4 | 1943 | 1.20 | 127.9 |
| 1928 | 1.17 | 120.0 | 1944 | 1.21 | 129.0 |
| 1929 | 1.27 | 118.2 | 1945 | 1.22 | 131.3 |
| 1930 | 1.19 | 107.2 | 1946 | 1.41 | 150.2 |
| 1931 | .65 | 90.6 | 1947 | 1.93 | 188.7 |
| 1932 | .87 | 80.4 | 1948 | 2.61 | 204.8 |
| 1933 | .67 | 81.8 | 1949 | [1] 2.54 | [2] 192.3 |

[1] Petroleum Industry Record, 1918–48.
[2] Calculated by API from BLS index.

TABLE J–8.—*United States wholesale prices of crude petroleum and principal products*

| | Refined products in 9 refinery markets | | | | | | Crude petroleum, 8 areas, per barrel | Spread between average and crude per barrel |
|---|---|---|---|---|---|---|---|---|
| | Motor gasoline, per gallon | Kerosene, per gallon | Light fuel, per gallon | Heavy fuel, per gallon | Average, 4 products | | | |
| | | | | | Per gallon | Per barrel | | |
| | *Cents* | *Cents* | *Cents* | *Cents* | *Cents* | | | |
| 1935 | 5.42 | 4.10 | 3.26 | 1.74 | 3.93 | $1.65 | $0.97 | $0.68 |
| 1936 | 6.32 | 3.94 | 3.39 | 1.81 | 4.41 | 1.85 | 1.09 | .76 |
| 1937 | 6.68 | 4.81 | 3.96 | 2.08 | 4.80 | 2.02 | 1.17 | .85 |
| 1938 | 5.97 | 4.57 | 3.62 | 1.55 | 4.22 | 1.77 | 1.14 | .63 |
| 1939 | 5.79 | 4.16 | 3.34 | 1.50 | 4.06 | 1.71 | 1.04 | .67 |
| 1940 | 5.26 | 4.36 | 3.55 | 1.74 | 3.91 | 1.64 | 1.02 | .62 |
| 1941 | 6.05 | 4.40 | 3.67 | 2.05 | 4.41 | 1.85 | 1.14 | .71 |
| 1942 | 6.14 | 4.56 | 3.91 | 2.18 | 4.54 | 1.91 | 1.20 | .71 |
| 1943 | 6.32 | 4.72 | 4.09 | 2.34 | 4.71 | 1.98 | 1.20 | .78 |
| 1944 | 6.47 | 4.78 | 4.34 | 2.49 | 4.87 | 2.05 | 1.20 | .85 |
| 1945 | 6.48 | 5.18 | 4.33 | 2.60 | 4.93 | 2.07 | 1.20 | .87 |
| 1946 | 6.60 | 5.70 | 5.06 | 3.05 | 5.26 | 2.21 | 1.39 | .82 |
| 1947 | 8.57 | 7.28 | 6.51 | 4.31 | 6.92 | 2.91 | 1.92 | .99 |
| 1948 | 10.53 | 9.92 | 8.94 | 5.72 | 8.81 | 3.70 | 2.59 | 1.11 |
| 1949 | 10.71 | 9.11 | 7.72 | 3.31 | 7.96 | 3.34 | 2.55 | .79 |
| *1949* | | | | | | | | |
| July | 10.74 | 8.67 | 7.07 | 2.80 | 7.70 | 3.23 | 2.54 | .69 |
| August | 10.74 | 8.56 | 7.20 | 3.02 | 7.78 | 3.27 | 2.54 | .73 |
| September | 10.74 | 8.72 | 7.49 | 2.92 | 7.81 | 3.28 | 2.53 | .75 |
| October | 10.71 | 8.84 | 7.64 | 3.14 | 7.88 | 3.31 | 2.53 | .78 |
| November | 10.50 | 8.79 | 7.59 | 3.16 | 7.78 | 3.27 | 2.53 | .74 |
| December | 10.41 | 8.88 | 7.63 | 3.28 | 7.78 | 3.27 | 2.53 | .74 |
| *1950* | | | | | | | | |
| January | 10.38 | 9.23 | 7.81 | 3.52 | 7.88 | 3.31 | 2.53 | .78 |
| February | 10.33 | 9.29 | 7.83 | 3.70 | 7.91 | 3.32 | 2.53 | .79 |
| March | 10.30 | 9.21 | 7.78 | 3.60 | 7.86 | 3.30 | 2.53 | .77 |
| April | 10.38 | 9.22 | 7.77 | 3.71 | 7.93 | 3.33 | 2.53 | .80 |
| May | 10.78 | 9.26 | 7.72 | 3.88 | 8.18 | 3.44 | 2.54 | .90 |
| June | 10.95 | 9.22 | 7.74 | 3.96 | 8.29 | 3.48 | 2.54 | .94 |
| July | 11.14 | 9.15 | 7.75 | 4.15 | 8.43 | 3.54 | 2.54 | 1.00 |
| August | 11.21 | 9.34 | 7.96 | 4.24 | 8.54 | 3.59 | 2.54 | 1.05 |
| September | 11.22 | 9.56 | 8.23 | 4.24 | 8.60 | 3.61 | 2.54 | 1.07 |

All prices based on low quotations from National Petroleum News. Individual products prices weighted as follows: Oklahoma, 16 percent; Midwestern Group 3, 20 percent Western Pennsylvania ,5.6 percent; New York Harbor, 10.4 percent; Philadelphia, 3.2 percent; Jacksonville, 1.6 percent; Boston, 1.6 percent; Gulf Coast, 21.6 percent; and Los Angeles, 20 percent. Four products average weighted as follows: Gasoline, 50 percent; kerosene, 5 percent; distillate, 15 percent; and residual, 30 percent. Crude price weighted as follows: Penn Grade, 1.6 percent; Illinois Basin, 4 percent; Oklahoma-Kansas, 26.4 percent; Northern Louisiana-Arkansas, 4 percent; East Texas, 8 percent; West Texas-New Mexico, 12 percent; Gulf Coast, 24 percent; and Signal Hill, 20 percent. Government-subsidy payments and charges collected and paid to transportation pool during war period excluded.

NOTE.—This information reflects the trend in oil prices but not the actual sales realization for producers or refiners.

Source: Independent Petroleum Association of America.

TABLE J–9.—*East of California wholesale prices of crude petroleum and principal products*

| | Refined products in 8 refinery markets | | | | | | Crude petroleum, 7 areas, per barrel |
|---|---|---|---|---|---|---|---|
| | Motor gasoline, per gallon | Kerosene, per gallon | Light fuel, per gallon | Heavy fuel, per gallon | Average, 4 products | | |
| | | | | | Per gallon | Per barrel | |
| | *Cents* | *Cents* | *Cents* | *Cents* | *Cents* | | |
| 1935 | 5.45 | 4.12 | 3.37 | 1.79 | 3.97 | $1.67 | $1.00 |
| 1936 | 6.12 | 4.01 | 3.52 | 1.86 | 4.35 | 1.83 | 1.11 |
| 1937 | 6.23 | 4.76 | 4.07 | 2.19 | 4.62 | 1.94 | 1.21 |
| 1938 | 5.45 | 4.39 | 3.78 | 1.62 | 4.00 | 1.68 | 1.17 |
| 1939 | 5.29 | 3.99 | 3.55 | 1.57 | 3.85 | 1.62 | 1.04 |
| 1940 | 4.96 | 4.33 | 3.80 | 1.90 | 3.84 | 1.61 | 1.04 |
| 1941 | 5.97 | 4.38 | 3.90 | 2.19 | 4.45 | 1.87 | 1.17 |
| 1942 | 6.28 | 4.57 | 4.17 | 2.26 | 4.67 | 1.96 | 1.23 |
| 1943 | 6.41 | 4.69 | 4.19 | 2.31 | 4.76 | 2.00 | 1.23 |
| 1944 | 6.42 | 4.73 | 4.17 | 2.46 | 4.81 | 2.02 | 1.23 |
| 1945 | 6.36 | 4.72 | 4.16 | 2.59 | 4.81 | 2.02 | 1.23 |
| 1946 | 6.40 | 5.38 | 4.84 | 3.08 | 5.12 | 2.15 | 1.43 |
| 1947 | 8.45 | 7.14 | 6.44 | 4.48 | 6.89 | 2.89 | 1.97 |
| 1948 | 10.21 | 9.62 | 8.94 | 5.90 | 8.70 | 3.65 | 2.64 |
| 1949 | 10.39 | 8.36 | 7.34 | 3.10 | 7.64 | 3.21 | 2.61 |
| *1949* | | | | | | | |
| July | 10.52 | 7.82 | 6.57 | 2.45 | 7.37 | 3.10 | 2.61 |
| August | 10.52 | 7.68 | 6.75 | 2.82 | 7.50 | 3.15 | 2.61 |
| September | 10.52 | 7.87 | 7.12 | 2.81 | 7.56 | 3.18 | 2.61 |
| October | 10.49 | 8.02 | 7.30 | 3.14 | 7.68 | 3.22 | 2.61 |
| November | 10.22 | 7.96 | 7.24 | 3.21 | 7.56 | 3.18 | 2.61 |
| December | 10.12 | 8.08 | 7.29 | 3.36 | 7.56 | 3.18 | 2.61 |
| *1950* | | | | | | | |
| January | 10.08 | 8.52 | 7.52 | 3.66 | 7.69 | 3.23 | 2.61 |
| February | 10.01 | 8.59 | 7.54 | 3.88 | 7.73 | 3.25 | 2.61 |
| March | 9.98 | 8.52 | 7.48 | 3.76 | 7.66 | 3.22 | 2.61 |
| April | 10.07 | 8.49 | 7.47 | 3.89 | 7.75 | 3.25 | 2.61 |
| May | 10.70 | 8.54 | 7.47 | 4.11 | 8.13 | 3.41 | 2.62 |
| June | 10.94 | 8.56 | 7.55 | 4.15 | 8.28 | 3.48 | 2.62 |
| July | 11.17 | 8.54 | 7.57 | 4.22 | 8.41 | 3.53 | 2.62 |
| August | 11.26 | 8.77 | 7.82 | 4.29 | 8.53 | 3.58 | 2.62 |
| September | 11.27 | 9.05 | 8.16 | 4.29 | 8.60 | 3.61 | 2.62 |

All prices based on low quotations from National Petroleum News. Individual products prices weighted as follows: Oklahoma, 20 percent; Midwestern Group 3, 25 percent; Western Pennsylvania, 7 percent; New York Harbor, 13 percent; Philadelphia, 4 percent; Jacksonville, 2 percent; Boston, 2 percent; Gulf Coast, 27 percent. Four products average weighted as follows: Gasoline, 50 percent; kerosene, 5 percent; distillate, 15 percent; and residual, 30 percent. Crude price weighted as follows: Penn Grade, 2 percent; Illinois Basin, 5 percent; Oklahoma-Kansas, 33 percent; Northern Louisiana-Arkansas, 5 percent; East Texas, 10 percent; West Texas-New Mexico, 15 percent; Gulf Coast, 30 percent. Government subsidy payments and charges collected and paid to transportation pool during war period excluded.

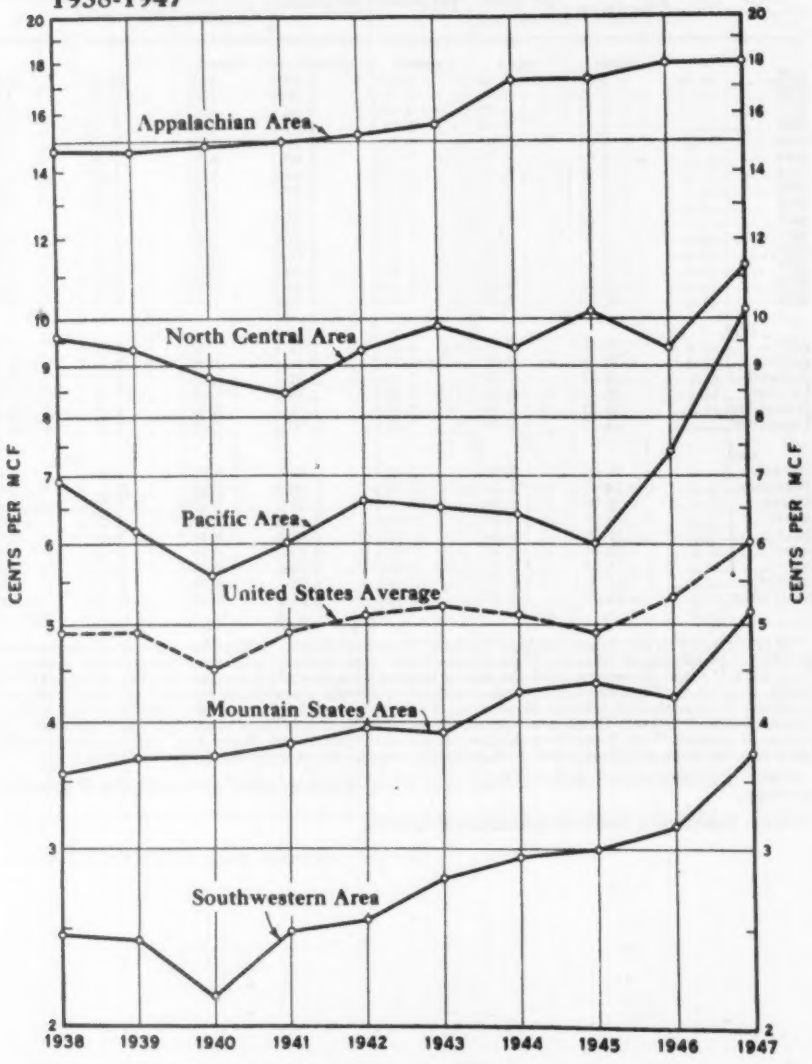
NOTE.—This information reflects the trend in oil prices but not the actual sales realization for producers or refiners.

Source: Independent Petroleum Association of America.

FIGURE J–4.

## Average Well-Mouth Price of Marketed Natural Gas

### By Areas and for the United States 1938-1947

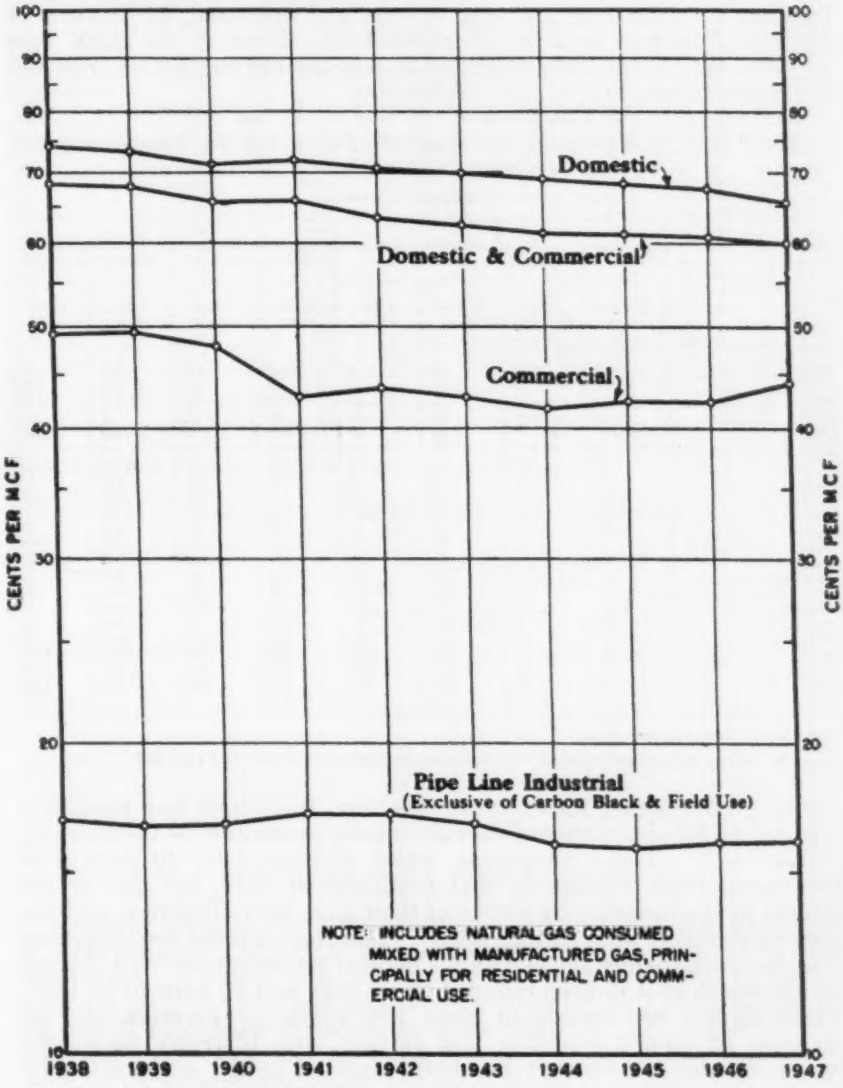



Source of data: U. S. Department of Interior, Bureau of Mines.

NOTE.—Southwestern area includes Texas, Louisiana, Oklahoma, New Mexico, Kansas, Mississippi, Arkansas, and Missouri. North central area includes Michigan, Illinois, and Indiana. Appalachian area includes New York, Pennsylvania, West Virginia, Ohio, and Kentucky. Pacific area refers to California. Mountain States area includes Wyoming, Montana, and Colorado.

FIGURE J–5.

## Average Natural Gas Prices To Consumers in the United States 1938 - 1947




Source: U. S. Bureau of Mines, Minerals Yearbook.

## 2. Profits

Profits in the different fuel industries from 1929 to 1949 present a varied picture for the main industries (table J–10). There were apparently relatively large profits in the petroleum industry and comparatively low profits for the coal-mining industry.

These low profits of bituminous coal-mining corporations and the number of companies showing deficits are indicated by Bureau of Internal Revenue statistics in table J–11. Even in the peak year of 1947, 466 of the 1,837 bituminous coal-mining companies reported net losses totaling more than $6,000,000.

Table J–10.—*Corporate income before and after Federal and State income and excess-profits taxes, by industry, 1942–49*

[Millions of dollars]

| Year | Anthracite mining | | Bituminous mining [1] | | Crude petroleum and natural gas | | Products of petroleum and coal | |
|---|---|---|---|---|---|---|---|---|
| | Before taxes | After taxes | Before taxes | After taxes | Before taxes | After taxes | Before taxes | After taxes |
| 1929 | 12 | 10 | 14 | 9 | 122 | 110 | 674 | 614 |
| 1930 | 14 | 12 | −12 | −15 | 35 | 25 | 255 | 222 |
| 1931 | 8 | 7 | −28 | −30 | −75 | −76 | −123 | −129 |
| 1932 | −12 | −12 | −34 | −35 | 16 | 12 | 3 | −3 |
| 1933 | −7 | −8 | −29 | −30 | 9 | 5 | −40 | −51 |
| 1934 | 0 | −1 | 12 | 8 | 103 | 93 | −9 | −18 |
| 1935 | −10 | −10 | 5 | 1 | 99 | 89 | 75 | 64 |
| 1936 | −4 | −5 | 9 | 5 | 145 | 130 | 220 | 193 |
| 1937 | −13 | −13 | 12 | 8 | 188 | 169 | 337 | 295 |
| 1938 | −18 | −18 | −17 | −19 | 120 | 107 | 100 | 82 |
| 1939 | −12 | −12 | 9 | 5 | 106 | 93 | 228 | 204 |
| 1940 | 7 | 6 | 37 | 29 | 124 | 107 | 321 | 265 |
| 1941 | 15 | 13 | 75 | 54 | 198 | 162 | 590 | 438 |
| 1942 | 17 | 13 | 102 | 66 | 127 | 99 | 697 | 475 |
| 1943 | 17 | 13 | 140 | 86 | 141 | 104 | 928 | 632 |
| 1944 | 23 | 16 | 145 | 93 | 159 | 121 | 662 | 570 |
| 1945 | 13 | 9 | 115 | 76 | 130 | 95 | 550 | 445 |
| 1946 | 34 | 24 | 116 | 83 | 200 | 152 | 964 | 728 |
| 1947 | 35 | 25 | 317 | 218 | 395 | 296 | 1,708 | 1,261 |
| 1948 | 40 | 28 | 421 | 288 | 613 | 437 | 2,746 | 1,999 |
| 1949 | 19 | 15 | 247 | 181 | 448 | 361 | 1,727 | 1,331 |

[1] Includes other soft coal mining.

Source: Survey of Current Business, National Income Number, July 1950, and July 1947.

The profit picture for 20 of the leading bituminous coal producers is of course far above that of average mining companies in the industry (table J–12). These companies, which accounted for 20 percent of the commercial tonnage of coal produced in 1947, are among the leaders in the industry by virtue of their size, their efficiency, and the aggressiveness of their management. Therefore it is not too surprising that these companies showed an 8.3 percent return on invested capital, or net worth as it is often referred to, in 1946 and 16 percent in 1947. These figures are significant since net worth, or invested capital, includes all equity securities and surplus, and therefore shows the return on the money that has been invested in the corporation by stockholders plus that which has been retained out of earnings.

TABLE J–11.—*Income and taxes of bituminous coal mining corporations, according to all Federal corporation tax returns*

| Year | Returns | Reporting net income | Reporting no net income | Net income of corporations showing income | Deficit of corporations showing loss | Net income or loss (−) | Federal taxes | Profit or loss (−) after Federal taxes |
|---|---|---|---|---|---|---|---|---|
| 1917 | 1,234 | 1,149 | 85 | $204,564,196 | $645,678 | $203,918,518 | $70,961,656 | $132,956,862 |
| 1918 | 1,234 | 1,106 | 128 | 150,094,603 | 1,247,971 | 148,846,632 | 65,763,660 | 83,082,972 |
| 1919 | 1,234 | 817 | 417 | 72,202,962 | 9,943,268 | 62,259,694 | 12,934,424 | 49,325,270 |
| 1920 | 1,234 | 1,152 | 82 | 251,025,514 | 1,658,135 | 249,367,379 | 76,223,563 | 173,143,816 |
| 1921 | 1,234 | 503 | 731 | 59,164,099 | 30,274,905 | 28,889,194 | 10,559,444 | 18,329,750 |
| 1925 | 3,650 | 1,065 | 2,585 | 40,462,955 | 62,826,452 | −22,363,497 | 4,517,057 | −26,880,554 |
| 1928 | 2,705 | 863 | 1,842 | 33,477,073 | 57,985,403 | −24,508,330 | 3,441,860 | −27,950,190 |
| 1929 | 2,469 | 934 | 1,535 | 40,068,844 | 51,890,877 | −11,822,033 | 4,000,019 | −15,822,052 |
| 1930 | 2,239 | 781 | 1,458 | 25,077,232 | 67,148,274 | −42,071,042 | 2,637,057 | −44,708,099 |
| 1931 | 2,095 | 582 | 1,513 | 9,957,000 | 57,702,000 | −47,745,000 | 1,039,000 | −48,784,000 |
| 1932 | 1,864 | 289 | 1,575 | 5,956,000 | 57,123,000 | −51,167,000 | 777,000 | −51,944,000 |
| 1933 | 1,851 | 396 | 1,455 | 7,243,000 | 54,792,000 | −47,549,000 | 1,029,000 | −48,578,000 |
| 1934 | 2,017 | 660 | 1,357 | 23,634,000 | 31,218,000 | −7,584,000 | 3,308,000 | −10,892,000 |
| 1935 | 1,975 | 591 | 1,384 | 19,566,000 | 35,142,000 | −15,576,000 | 2,750,000 | −18,326,000 |
| 1936 | 1,945 | 590 | 1,355 | 25,183,000 | 28,493,000 | −3,310,000 | 3,214,000 | −6,524,000 |
| 1937 | 1,815 | 539 | 1,276 | 22,289,000 | 23,066,000 | −777,000 | 3,208,000 | −3,985,000 |
| 1938 | 1,887 | 363 | 1,524 | 11,112,000 | 37,779,000 | −26,667,000 | 1,661,000 | −28,328,000 |
| 1939 | 1,820 | 505 | 1,315 | 18,257,000 | 24,425,000 | −6,168,000 | 2,844,000 | −9,012,000 |
| 1940 | 1,756 | 676 | 1,080 | 30,013,000 | 15,617,000 | 14,396,000 | 6,593,000 | 7,803,000 |
| 1941 | 1,722 | 859 | 863 | 56,831,000 | 14,180,000 | 42,651,000 | 19,065,000 | 23,586,000 |
| 1942 | 1,737 | 906 | 831 | 77,042,000 | 9,127,000 | 67,915,000 | 33,790,000 | 34,125,000 |
| 1943 | 1,623 | 975 | 648 | 103,153,000 | 6,996,000 | 96,157,000 | 49,244,000 | 46,913,000 |
| 1944 | 1,584 | 932 | 652 | 101,000,000 | 8,263,000 | 92,736,000 | 48,926,000 | 43,810,000 |
| 1945 | 1,544 | 915 | 629 | 81,412,000 | 10,119,000 | 71,294,000 | 35,613,000 | 35,681,000 |
| 1946 | 1,640 | 1,013 | 627 | 89,553,000 | 9,016,000 | 80,537,000 | 29,975,000 | 50,562,000 |
| 1947 | 1,837 | 1,371 | 466 | 264,751,000 | 6,093,000 | 258,658,000 | 90,224,000 | 168,434,000 |

Source: Statistics of Income, pt. 2, U. S. Bureau of Internal Revenue.

TABLE J–12.—*Financial data on 20 bituminous coal mining companies, 1946–47* [1]

| Year | Net investment (millions) | | | Net income | Rate of return on invested capital |
|---|---|---|---|---|---|
| | Borrowed capital | Invested capital | Total | | |
| | | | | | *Percent* |
| 1946 | 55.5 | 287.7 | 343.2 | 23.9 | 8.3 |
| 1947 | 71.1 | 327.2 | 398.3 | 52.2 | 16.0 |

[1] These 20 companies are the following: American Coal Co. of Allegany County, Ayrshire Collieries Corp., Chicago, Wilmington & Franklin Coal Co., Franklin County Coal Corp., Hatfield-Campbell Creek Coal Co., Island Creek Coal Co., North American Coal Corp., Northern Illinois Coal Corp., Old Ben Coal Co., Peabody Coal Co., Pennsylvania Coal & Coke Corp., Pittston Co., Pittsburgh Consolidation Coal Co., Pond Creek Pocahontas Coal Co., Rochester & Pittsburgh Coal Co., St. Louis, Rocky Mountain & Pacific Co., Truax-Traer Coal Co., United Electric Coal Co's., Westmoreland Coal Co., West Virginia Coal & Coke Co.

Source: Dean, Roy E., Financing Bituminous Coal. Coal Age, January 1949, p. 794.

Financial data on 30 of the leading oil companies is also available. In this industry, however, size is tremendous as compared to coal companies. There is also greater concentration of output in the oil industry with the first companies accounting for 82.7 percent of total output of petroleum refineries in 1947 (table J–13). Since concentration decreases rapidly after the first 20 companies the data for 30 leading oil companies would be little changed if only the leading 20 were taken.

TABLE J–13.—*Concentration of output in the largest petroleum refinery companies, 1935 and 1947*

| Number of companies | Value of shipments | 1947 concentration ratios | | | | 1935 concentration ratios | |
|---|---|---|---|---|---|---|---|
| | | First 4 companies | First 8 companies | First 20 companies | First 50 companies | First 4 companies | First 8 companies |
| 277 | $6,623,708,000 | 37.3 | 58.8 | 82.7 | 91.7 | 38.2 | 58.9 |

Source: U. S. Department of Commerce, Concentration of Output in the Largest Manufacturing Companies. Prepared for Hon. Emanuel Celler, chairman, Subcommittee on Study of Monopoly Power, Committee on the Judiciary. Dec. 1, 1949.

TABLE J–14.—*Return on invested capital of 30 oil companies,*[1] *years 1934–44*

[Millions of dollars]

| Year | Average invested capital | Net income | Rate of return based on net income | Year | Average invested capital | Net income | Rate of return based on net income |
|---|---|---|---|---|---|---|---|
| | | | *Percent* | | | | *Percent* |
| 1934 | $5,457 | $157 | 2.9 | 1942 | 6,154 | 404 | 6.6 |
| 1935 | 5,302 | 253 | 4.8 | 1943 | 6,351 | 510 | 8.0 |
| 1936 | 5,437 | 412 | 7.6 | 1944 | 6,648 | 639 | 9.6 |
| 1937 | 5,730 | 573 | 10.0 | 1945 | [3] 7,485 | 602 | 8.6 |
| 1938 | 5,923 | 300 | 5.1 | 1946 | [3] 8,002 | 763 | 10.3 |
| 1939 | 5,973 | 321 | 5.4 | 1947 | 8,189 | 1,219 | 14.9 |
| 1940 | 5,997 | 377 | 6.3 | 1948 | 9,669 | 1,929 | 20.0 |
| 1941 | 6,031 | 530 | 8.8 | 1949 | 10,907 | 1,408 | 12.9 |

[1] The 30 companies included in the study are Amerada Petroleum Co., Atlantic Refining Co., Cities Service Co., Continental Oil Co., Gulf Oil Corp., Houston Oil Co. of Texas, Lion Oil Co., Louisiana Land & Exploration Co., Mid-Continent Petroleum Corp., Ohio Oil Co., Pacific Western Oil Corp., Phillips Petroleum Co., Plymouth Oil Co., Pure Oil Co., Richfield Oil Corp., Seaboard Oil Co. of Delaware, Shell Oil Co., Sinclair Oil Co., Skelley Oil Co., Socony-Vacuum Oil Co., Standard Oil Co. of California, Standard Oil Co. (Indiana), Standard Oil Co. (New Jersey), Standard Oil Co. (Ohio), Sun Oil Co., Texas Co., Texas Gulf Producing Co., Texas Pacific Coal & Oil Co., Tidewater Associated Oil Co., Union Oil Co. of California. (Cities Service Co. has replaced Barnsdall Oil Co. which merged with Sunray Oil Co.).

[3] As of Dec. 31, instead of average for the year.

Source: Financial Analysis of Thirty Oil Companies, by Joseph E. Pogue, vice president, and Frederick G. Coqueron, petroleum department, the Chase National Bank, 1947, 1949.

TABLE J–15.—*Financial statistics of natural-gas companies* [1]

| Year | Invested capital | Net income | Rate of return on invested capital |
|---|---|---|---|
| 1947 | 1,190,528,000 | 123,357,000 | 10.4 |
| 1948 | 1,353,687,000 | 134,093,000 | 9.9 |
| 1949 | 1,531,273,000 | 140,132,000 | 9.2 |

[1] These are companies reporting to Federal Power Commission which derive 50 percent of their revenues from sale of natural gas.

Source: Federal Power Commission.

Financial data on 30 oil companies shows that these companies had a 20 percent rate of return on their invested capital in the peak year of 1920 (table J–14). To show more correctly the rate of return earned on invested capital the yearly average is used rather than year-end figures. Figures on yearly price spreads between crude petroleum and principal products indicated that 1948 would be the peak year (table J–8).

Natural gas companies have shown a decreasing rate of return on invested capital since 1947 when a return of 10.4 percent was reported (table J–15). The companies included in this data represent about 50 percent of the industry. Data which is not included indicate that since 1939 the rate of return has risen steadily from 7 percent to the high of 10.4 percent in 1947.

### 3. Investment

Total investment in the coal industry was estimated in 1939 by the National Resources Committee to be from 2½ to 3 billion dollars; of this amount from 2 to 2½ billion was estimated to be invested in bituminous coal. Net investment of 20 large bituminous companies increased from 287.7 millions of dollars in 1946 to 327.2 millions in 1947 (table J–12). No total industry figures later than 1939 have been found.

Gross capital invested in the oil industry grew from an estimated $14,750,000,000 in 1938 to $23,500,000,000 in 1949 (table J–16). In 1949 30 oil companies had $19,183,462,000 in gross investment and $9,982,490,000 in net investment (table J–17). The net figure is arrived at by subtracting reserves of $9,200,972,000. Average invested capital of these 30 oil companies has increased in each year since 1935 with sharp increases since 1947 (table J–14).

TABLE J–16.—*Estimated gross and net investment in property, plant, and equipment of the petroleum industry in the United States Dec. 31, 1949*

[In millions of dollars]

| Department | Gross investment | Reserves | Net investment |
|---|---|---|---|
| Leases, wells, and equipment | 11,750 | 6,350 | 5,400 |
| Natural gasoline plants | 725 | 275 | 450 |
| Natural gas | 300 | 100 | 200 |
| Total production | 12,775 | 6,725 | 6,050 |
| Crude oil pipelines | 1,475 | 750 | 725 |
| Product pipelines | 325 | 125 | 200 |
| Marine | 1,150 | 450 | 700 |
| Tank cars | 275 | 200 | 75 |
| Motor transport | 75 | 25 | 50 |
| Total transportation | 3,300 | 1,550 | 1,750 |
| Refining | 4,375 | 2,225 | 2,150 |
| Marketing | 2,750 | 1,100 | 1,650 |
| Others | 300 | 100 | 200 |
| Total, all departments | 23,500 | 11,700 | 11,800 |

DISTRIBUTION BY DEPARTMENTS

| | Gross | Net |
|---|---|---|
| | *Percent* | *Percent* |
| Production | 54.4 | 51.3 |
| Transportation | 14.0 | 14.8 |
| Refining | 18.6 | 18.2 |
| Marketing | 11.7 | 14.0 |
| Others | 1.3 | 1.7 |
| Total | 100.0 | 100.0 |

Source: Pogue, Joseph E. and Coqueron, Frederick G. Financial Analysis of Thirty Oil Companies for 1949, Petroleum Department, Chase National Bank, New York, 1950. p. 15.

TABLE J–17.—*Gross and net investment in property, plant, and equipment of 30 oil companies Dec. 31, 1949*

BY DEPARTMENTS AND SEGREGATED BETWEEN DOMESTIC AND FOREIGN

[In thousands of dollars]

| Department | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | United States | Foreign countries | Domestic and foreign | United States | Foreign countries | Domestic and foreign |
| Leases, wells, equipment, and natural gasoline plants | 8,196,040 | 1,297,101 | 9,493,141 | 3,915,061 | 708,438 | 4,623,499 |
| Natural gas | 373,932 | 21,251 | 395,183 | 247,137 | 12,474 | 259,611 |
| Total production | 8,569,972 | 1,318,352 | 9,888,324 | 4,162,198 | 720,912 | 4,883,110 |
| Crude oil pipelines | 1,256,375 | 139,975 | 1,396,350 | 633,210 | 92,056 | 725,266 |
| Product pipelines | 210,105 | 0 | 210,105 | 134,028 | 0 | 134,028 |
| Marine | 554,560 | 166,471 | 721,031 | 348,271 | 105,249 | 453,520 |
| Tank cars | 39,329 | 293 | 39,622 | 10,794 | 31 | 10,825 |
| Motor transport | 36,274 | 1,345 | 37,619 | 22,998 | 878 | 23,876 |
| Total transportation | 2,096,643 | 308,084 | 2,404,727 | 1,149,301 | 198,214 | 1,347,515 |
| Refining | 3,789,900 | 366,001 | 4,155,901 | 1,863,400 | 218,167 | 2,081,567 |
| Marketing | 2,066,566 | 233,178 | 2,299,744 | 1,251,568 | 134,971 | 1,386,539 |
| Others | 421,529 | 13,237 | 434,766 | 279,371 | 4,388 | 283,759 |
| Total, all departments | 16,944,610 | 2,238,852 | 19,183,462 | 8,705,838 | 1,276,652 | 9,982,490 |

DISTRIBUTION BY DEPARTMENTS

[Percent]

| Department | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| | United States | Foreign countries | Domestic and foreign | United States | Foreign countries | Domestic and foreign |
| Production | 50.6 | 58.9 | 51.5 | 47.8 | 56.5 | 48.9 |
| Transportation | 12.4 | 13.8 | 12.5 | 13.2 | 15.5 | 13.5 |
| Refining | 22.3 | 16.3 | 21.7 | 21.4 | 17.1 | 20.9 |
| Marketing | 12.2 | 10.4 | 12.0 | 14.4 | 10.6 | 13.9 |
| Others | 2.5 | .6 | 2.3 | 3.2 | .3 | 2.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

BY DEPARTMENTS

| Department | Gross investment | Reserves | Net investment | Net in relation to gross |
|---|---|---|---|---|
| | *Millions* | *Millions* | *Millions* | *Percent* |
| Production | $9,888 | $5,005 | $4,883 | 49.4 |
| Transportation | 2,405 | 1,057 | 1,348 | 56.0 |
| Refining | 4,156 | 2,075 | 2,081 | 50.1 |
| Marketing | 2,300 | 913 | 1,387 | 60.3 |
| Others | 434 | 151 | 283 | 65.2 |
| Total | 19,183 | 9,201 | 9,982 | 52.0 |

Source: Pogue, Joseph E., and Coqueron, Frederick G., Financial Analysis of 30 Oil Companies for 1949. Petroleum Department, Chase National Bank, New York, 1950, p. 12.

TABLE J–18.—*Gross expenditures for property, plant, and equipment of 30 oil companies*

BY DEPARTMENTS AND SEGREGATED BETWEEN DOMESTIC AND FOREIGN, YEAR 1949

[Thousands of dollars]

| Department | United States | Foreign countries | Domestic and foreign |
|---|---|---|---|
| Leases, wells, and equipment | $995,667 | $196,420 | $1,192,087 |
| Natural gasoline plants | 101,027 | 1 | 101,028 |
| Crude oil marketing | 513 | 0 | 513 |
| Natural gas | 31,437 | 762 | 32,199 |
| Total, production | 1,128,644 | 197,183 | 1,325,827 |
| Crude oil pipelines | 122,969 | 14,298 | 137,267 |
| Product pipelines | 6,387 | 0 | 6,387 |
| Marine | 69,580 | 7,932 | 77,512 |
| Tank cars | 2,729 | 0 | 2,729 |
| Motor transport | 5,441 | 380 | 5,821 |
| Total, transportation | 207,106 | 22,610 | 229,716 |
| Refining | 388,538 | 63,915 | 452,453 |
| Marketing | 193,083 | 25,133 | 218,216 |
| Others | 55,781 | 1,956 | 57,737 |
| Total, all departments | 1,973,152 | 310,797 | 2,283,949 |
| Additions to property accounts | 1,797,625 | 273,813 | 2,071,438 |
| Intangible development costs charged to income | 24,031 | 321 | 24,352 |
| Dry-hole costs charged to income | 127,924 | 36,663 | 164,587 |
| Lease purchases charged to income | 832 | 0 | 832 |
| Other expenditures | 22,740 | 0 | 22,740 |
| Total | 1,973,152 | 310,797 | 2,283,949 |

BY DEPARTMENTS, YEARS 1948 AND 1949

| Department | 1948 | 1949 | Distribution | |
|---|---|---|---|---|
| | | | 1948 | 1949 |
| | *Millions* | *Millions* | *Percent* | *Percent* |
| Production | $1,517 | $1,326 | 56.0 | 58.1 |
| Transportation | 311 | 230 | 11.5 | 10.1 |
| Refining | 579 | 452 | 21.4 | 19.8 |
| Marketing | 215 | 218 | 7.9 | 9.5 |
| Others | 86 | 58 | 3.2 | 2.5 |
| Total | 2,708 | 2,284 | 100.0 | 100.0 |

Invested capital in natural-gas companies representing about half the industry increased from $1,190,528,000 to $1,531,273,000 between 1947 and 1949 (table J–15). Of even greater significance in this industry is the tremendous expansion taking place especially in transmission facilities (tables J–19 and J–20). Between 1950 and 1954 the natural-gas industry plans, according to reports, to spend $2,463,900,000 on construction. Of this total $1,518,300,000 would be for construction of transmission facilities. The defense effort may, of course, reduce these contemplated expenditures drastically. The large expenditures made since 1945 in this industry were to a large extent for transmission facilities.

Privately owned class A and B electric utilities at the end of June 1950 had a net investment in electric plants of $14,306,500,000 compared with $12,848,000,000 1 year earlier, a net increase of 11.3 percent.

TABLE J–19.—*Gas utility construction expenditures, by type of gas and by plant function, 1949–54*

[Millions of dollars]

| Type of gas and plant function | Actual, 1949 | Forecast | | | | | Total forecast, 1950–54 | Total actual, 1945–49 |
|---|---|---|---|---|---|---|---|---|
| | | 1950 | 1951 | 1952 | 1953 | 1954 | | |
| Natural gas, total | $848.1 | $954.3 | $890.8 | $365.1 | $276.9 | $259.7 | $2,746.8 | $2,463.9 |
| Production and storage [1] | 69.1 | 87.3 | 101.0 | 53.9 | 60.2 | 52.0 | 354.4 | 298.7 |
| Transmission | 567.7 | 645.6 | 564.7 | 119.8 | 41.3 | 37.7 | 1,409.1 | 1,518.3 |
| Distribution | 182.0 | 193.5 | 199.6 | 174.4 | 163.6 | 158.5 | 889.6 | 557.8 |
| General | 29.3 | 27.9 | 25.5 | 17.0 | 11.8 | 11.5 | 93.7 | 89.1 |
| All other types of gas, total | 111.1 | 112.1 | 90.4 | 63.0 | 55.7 | 67.2 | 388.4 | 492.6 |
| Production and storage | 42.5 | 37.2 | 19.4 | 12.8 | 9.5 | 21.8 | 100.7 | 212.1 |
| Transmission | 5.8 | 5.2 | 21.3 | 6.4 | 6.4 | 6.4 | 45.7 | 18.8 |
| Distribution | 57.7 | 64.2 | 45.8 | 39.9 | 36.1 | 35.2 | 221.2 | 241.0 |
| General | 5.1 | 5.5 | 3.9 | 3.9 | 3.7 | 3.8 | 20.8 | 20.7 |
| Total industry, total | 959.2 | 1,066.4 | 981.2 | 428.1 | 332.6 | 326.9 | 3,135.2 | 2,956.5 |
| Production and storage [1] | 111.6 | 124.5 | 120.4 | 66.7 | 69.7 | 73.8 | 455.1 | 510.8 |
| Transmission | 573.5 | 650.8 | 586.0 | 126.2 | 47.7 | 44.1 | 1,454.8 | 1,537.1 |
| Distribution | 239.7 | 257.7 | 245.4 | 214.3 | 199.7 | 193.7 | 1,110.8 | 798.8 |
| General | 34.4 | 33.4 | 29.4 | 20.9 | 15.5 | 15.3 | 114.5 | 109.8 |

[1] Includes underground storage facilities.

NOTE.—See text for procedures employed in preparation.

Source: Gas Facts, 1949.

TABLE J–20.—*Gas utility construction expenditures, 1932–54*

[Millions]

| Year | Construction expenditures | Year | Construction expenditures | Year | Construction expenditures |
|---|---|---|---|---|---|
| 1932 | $84 | 1940 | $116 | 1948 | $770 |
| 1933 | 44 | 1941 | 140 | 1949 | 959 |
| 1934 | 53 | 1942 | 111 | 1950 [1] | 1,066 |
| 1935 | 60 | 1943 | 75 | 1951 [2] | 981 |
| 1936 | 90 | 1944 | 162 | 1952 [2] | 428 |
| 1937 | 97 | 1945 | 160 | 1953 [2] | 333 |
| 1938 | 79 | 1946 | 810 | 1954 [2] | 327 |
| 1939 | 74 | 1947 | 758 | | |

[1] Forecast.
[2] Estimated.

TABLE J–21.—*Gas utility construction expenditures, by type of gas, 1945–50*

[Millions of dollars]

| Year | Total | Natural | Manufactured | Mixed | Liquefied petroleum |
|---|---|---|---|---|---|
| 1945 | 160.4 | 126.3 | 27.1 | 6.5 | 0.5 |
| 1946 | 309.6 | 236.8 | 57.9 | 10.7 | 4.2 |
| 1947 | [1] 757.8 | [1] 623.6 | 110.7 | 16.7 | 6.8 |
| 1948 | 769.6 | 629.2 | 116.9 | 19.3 | 4.2 |
| 1949, total | 959.2 | 848.1 | 89.8 | 17.8 | 3.5 |
| Production and storage | 111.6 | 69.1 | 33.6 | 7.1 | 1.8 |
| Transmission | 573.5 | 567.7 | 4.7 | 1.0 | .1 |
| Distribution | 239.7 | 182.0 | 47.6 | 8.7 | 1.4 |
| General | 34.4 | 29.3 | 3.9 | 1.0 | .2 |
| 1950 (forecast), total | 1,066.4 | 954.3 | 93.8 | 15.3 | 3.0 |
| Production and storage | 124.5 | 87.3 | 32.7 | 3.0 | 1.5 |
| Transmission | 650.8 | 645.6 | 5.2 | [2] | [2] |
| Distribution | 257.7 | 193.5 | 51.9 | 10.9 | 1.4 |
| General | 33.4 | 27.9 | 4.0 | 1.4 | .1 |

[1] Includes $143,127,000 cost of Big Inch and Little Big Inch pipelines purchased for conversion to transmission of gas.
[2] Less than $50,000.

Source: Gas Facts, 1949.

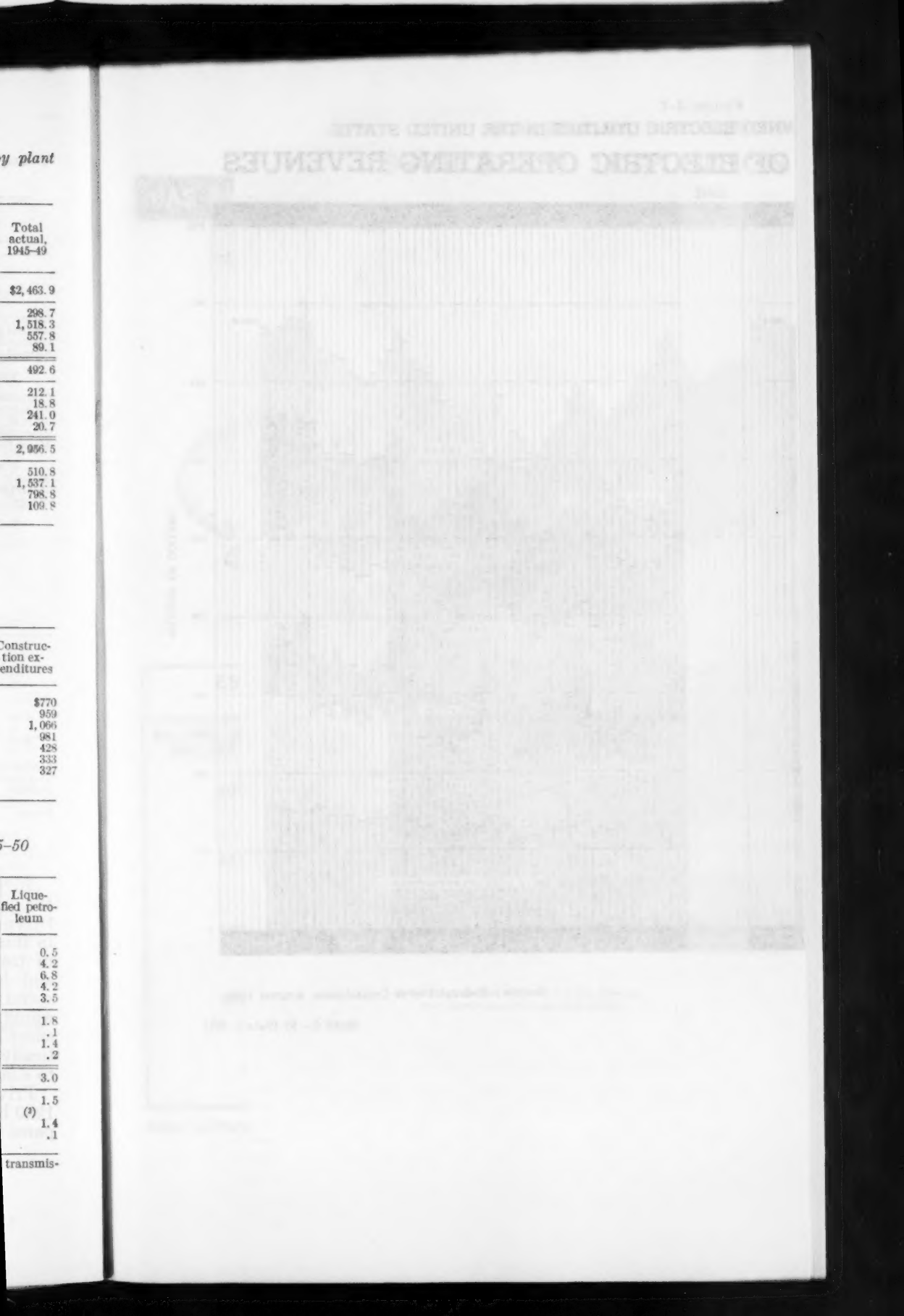
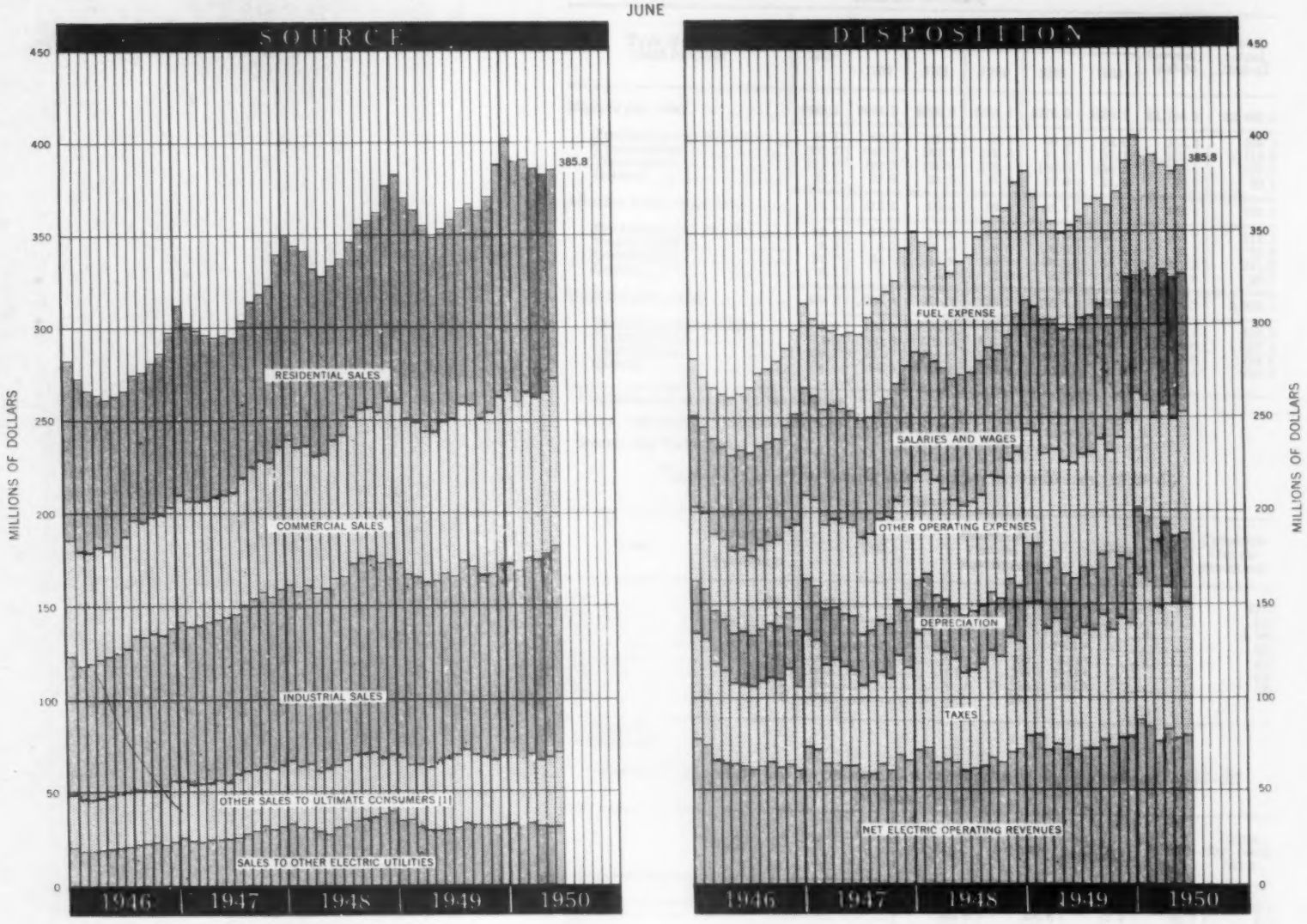


FIGURE J-7

CLASSES A AND B PRIVATELY OWNED ELECTRIC UTILITIES IN THE UNITED STATES

# SOURCE AND DISPOSITION OF ELECTRIC OPERATING REVENUES

JUNE




*(1) Includes, in addition to revenues from sales of energy, other miscellaneous electric operating revenues.*

Source: Federal Power Commission, August 1950

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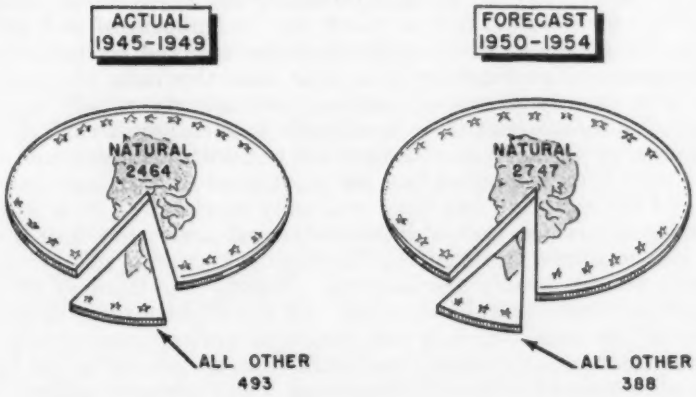
FIGURE J–6.

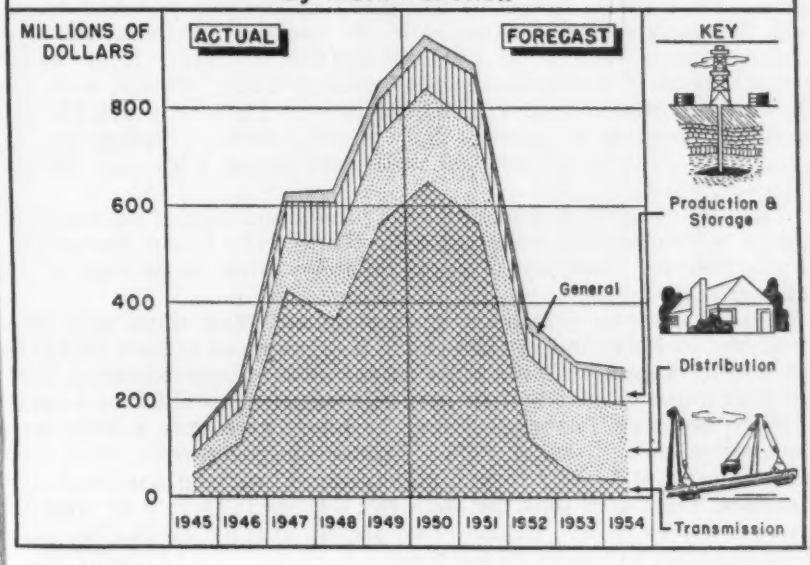
## GAS INDUSTRY CONSTRUCTION EXPENDITURES

### PAST AND ANTICIPATED EXPENDITURES
### By Type of Gas

(MILLIONS OF DOLLARS)




### ESTIMATED NATURAL GAS EXPENDITURES
### By Plant Function




Source: Gas Facts, 1949.

## CHAPTER V

## EMPLOYMENT AND PRODUCTIVITY

It is widely recognized that we have been living in an age of major scientific advances and of vast technological applications of known scientific principles. There is much less recognition of and information on the extent to which technology has affected productivity and employment. Nevertheless it is clear that the tools of production have been greatly expanded and are increasingly widely used. In general this means that there is a larger application of capital (tools) and a smaller application of labor time per unit of production.

Not only the production but the movement of fuels and energy to points of consumption has been gradually mechanized to a relatively high degree. In the case of bituminous coal nearly one-fourth of the total is now mined by stripping (mechanical removal of overburden) hence is almost wholly mechanized. Nearly one-third of the total production is mechanically cleaned. Of the slightly more than three-fourths of the total which is still produced underground, nearly two-thirds is mechanically loaded and more than 90 percent is cut by machines as compared with only 23 percent a half century earlier. Thus it is not surprising that with the average miner working approximately the same number of days as 50 years before (somewhat more than 200 days per year but fewer hours per day) he on the average produced in 1948 6.26 tons of coal per day per man against only 3.09 tons in 1898. On a yearly basis this amounts to 1,358 tons per man against 651 50 years before. Meanwhile the number of men employed declined from 460,629 in 1905 to 433,698 in 1949. Even at the postwar peak of production in 1947 when 630,623,722 tons were produced as compared with 315,062,785 tons in 1905, only 419,182 men were employed as an average daily working force. During one war year, 1944, nearly 620,000,000 tons were mined with only 393,347 men employed.

The number of strip mines and the production thereof has increased nearly a hundredfold since prior to World War I and the average production per man-day is approximately three times that of the underground miner.

The miners who continued in employment (and there were more employed in 1949 than in 1939 (table K–3)) appear to have had average weekly earnings at the most recent date of approximately three times as much as in 1939. In part this was accounted for by a longer average workweek; average hourly earnings were only a little more than twice as high as in 1939. Production meanwhile, with more strip mining and mechanized underground working involved, had increased from 5.25 tons per man per day in 1939 to 6.44 tons per man per day in 1949. Value of coal per ton at the mine had increased from $1.84 per ton to $4.88 per ton.

The story in regard to Pennsylvania anthracite coal is only in a very general way the same as that for bituminous in respect to employment, productivity, and technological advance. Both production and men employed have declined sharply and persistently, the number of men declining more rapidly than the production, particularly in the recent period; employment stood at 176,552 in 1915 and only 75,377 in 1949 whereas total production had dropped about 50 percent. Thus average production in tons per man per day increased from 2.19 in 1915 to 2.87 tons in 1949. If 1898 is compared with 1948 the number employed was 145,504 versus 76,215 and the average tons per man per day 2.41 versus 2.81.

Technological advances appear to have been mostly of two sorts: an increase in production by strip mining from 1,121,603 tons in 1915 to 13,352,874 tons in 1948, an increase in the index (1937=100) from 38 in 1927 to 234 in 1948. Mechanical loading underground has also much increased—from 2,223,281 tons in 1927 to 15,742,368 tons in 1948—or an index increase from 20 in 1927 to 147 in 1948.

TABLE K–1.—*Production, value, employment, output per man, number of mines and mechanization in the bituminous coal and lignite mining industries in the United States, 1905, 1910, 1915, 1920–49*

| Year | Production (net tons) | Value per ton (f. o. b. mines [1]) | Men employed | Tons per man per day | Number of mines | Percent of underground production | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cut by machines [2] | Mechanically loaded |
| 1905 | 315,062,785 | 1.06 | 460,629 | 3.24 | 5,060 | 32.8 | ([3]) |
| 1910 | 417,111,142 | 1.12 | 555,533 | 3.46 | 5,818 | 41.7 | ([3]) |
| 1915 | 442,624,426 | 1.13 | 557,456 | 3.91 | 5,502 | 55.3 | ([3]) |
| 1920 | 568,666,683 | 3.75 | 639,547 | 4.00 | 8,921 | 60.7 | ([3]) |
| 1921 | 415,921,950 | 2.89 | 663,754 | 4.20 | 8,038 | 66.4 | ([3]) |
| 1922 | 422,268,099 | 3.02 | 687,958 | 4.28 | 9,299 | 64.8 | ([3]) |
| 1923 | 564,564,662 | 2.68 | 704,793 | 4.47 | 9,331 | 68.3 | 0.3 |
| 1924 | 483,686,538 | 2.20 | 619,604 | 4.56 | 7,586 | 71.5 | .7 |
| 1925 | 520,052,741 | 2.04 | 588,493 | 4.52 | 7,144 | 72.9 | 1.2 |
| 1926 | 573,366,985 | 2.06 | 593,647 | 4.50 | 7,177 | 73.8 | 1.8 |
| 1927 | 517,763,352 | 1.99 | 593,918 | 4.55 | 7,011 | 74.9 | 3.3 |
| 1928 | 500,744,970 | 1.86 | 522,150 | 4.73 | 6,450 | 76.9 | 4.5 |
| 1929 | 534,988,593 | 1.78 | 502,993 | 4.85 | 6,057 | 78.4 | 7.4 |
| 1930 | 467,526,299 | 1.70 | 493,202 | 5.06 | 5,891 | 81.0 | 10.5 |
| 1931 | 382,089,396 | 1.54 | 450,213 | 5.30 | 5,642 | 83.2 | 13.1 |
| 1932 | 309,709,872 | 1.31 | 406,380 | 5.22 | 5,427 | 84.1 | 12.3 |
| 1933 | 333,630,533 | 1.34 | 418,703 | 4.78 | 5,555 | 84.7 | 12.0 |
| 1934 | 359,368,022 | 1.75 | 458,011 | 4.40 | 6,258 | 84.1 | 12.2 |
| 1935 | 372,373,122 | 1.77 | 462,403 | 4.50 | 6,315 | 84.2 | 13.5 |
| 1936 | 439,087,903 | 1.76 | 477,204 | 4.62 | 6,875 | 84.8 | 16.3 |
| 1937 | 445,531,449 | 1.94 | 491,864 | 4.69 | 6,548 | ([3]) | 20.2 |
| 1938 | 348,544,764 | 1.95 | 441,333 | 4.89 | 5,777 | 87.5 | 26.7 |
| 1939 | 394,855,326 | 1.84 | 421,788 | 5.25 | 5,820 | 87.9 | 31.0 |
| 1940 | 460,771,500 | 1.91 | 439,075 | 5.19 | 6,324 | 88.4 | 35.4 |
| 1941 | 514,149,245 | 2.19 | 456,981 | 5.20 | 6,822 | 89.0 | 40.7 |
| 1942 | 582,692,937 | 2.36 | 461,991 | 5.12 | 6,972 | 89.7 | 45.2 |
| 1943 | 590,177,069 | 2.69 | 416,007 | 5.38 | 6,620 | 90.3 | 48.9 |
| 1944 | 619,576,240 | 2.92 | 393,347 | 5.67 | 6,928 | 90.5 | 52.9 |
| 1945 | 577,617,327 | 3.06 | 383,100 | 5.78 | 7,033 | 90.8 | 56.1 |
| 1946 | 533,922,068 | 3.44 | [4] 396,434 | 6.30 | 7,333 | 90.8 | 58.4 |
| 1947 | 630,623,722 | 4.16 | [4] 419,182 | 6.42 | 8,700 | 90.0 | 60.7 |
| 1948 | 599,518,229 | 4.99 | [4] 441,631 | 6.28 | 9,079 | 90.7 | 64.3 |
| 1949 | 437,868,036 | 4.88 | 433,698 | 6.43 | 8,559 | 91.5 | 67.0 |

[1] Figures on values per ton for 1905, 1910, 1915, 1920 to 1936, inclusive, and 1939, exclude selling expense. Figures for other years include selling expense.

[2] Percentages for 1905 and 1910 are of total production, as a separation of strip and underground production is not available for those years.

[3] Data not available.

[4] Average number of men working daily.

Source: Coal Economics Branch, Fuels and Explosives Division Bureau of Mines, Department of the Interior.

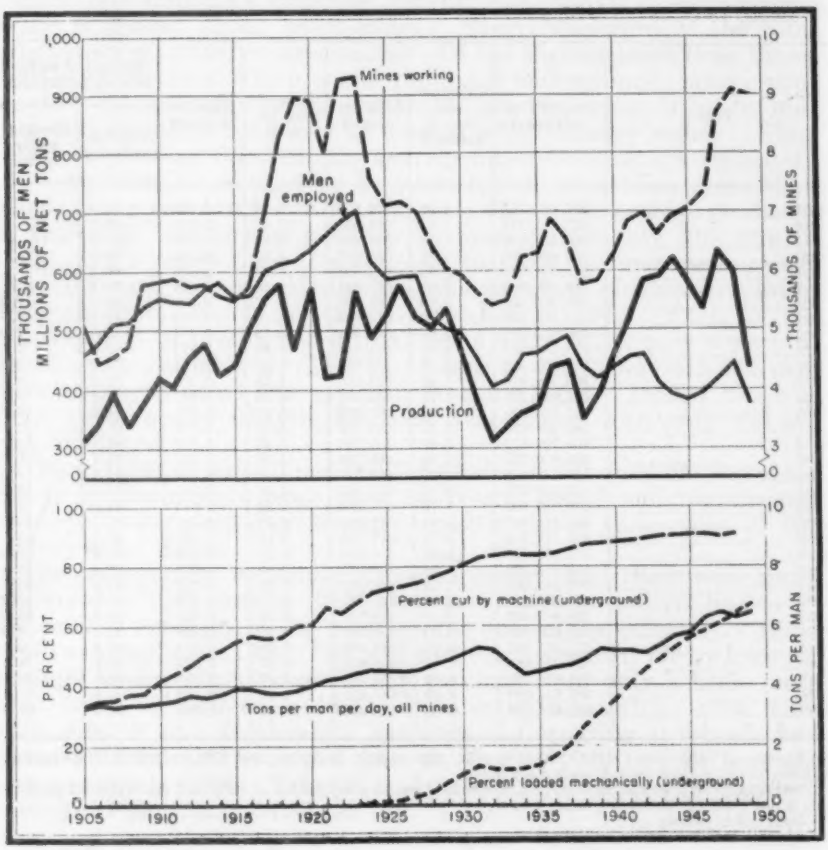
In the past 10 years tonnage produced per man per day has been approximately static, average weekly and hourly earnings per miner has approximately doubled and the average price per ton has increased from $3.64 to $8.56. Exports and imports have both been relatively small, except for increased exports during and after the wars.

In regard to the production of petroleum natural gas and hydroelectric power, it may be said that the processes have long been mechanized to a very high degree and resting heavily on technology.

The oil and gas industry employs some thousands more than the anthracite coal industry but less than one-third the total employed in bituminous coal production.

Earnings of labor so employed more than doubled between 1939 and 1949 on either a weekly or an hourly basis. The average workweek is apparently somewhat longer than in the coal industry, hence with hourly earnings almost up to those of the coal mines, weekly earnings are somewhat higher than those of miners.

FIGURE K–1.—TRENDS OF PRODUCTION, EMPLOYMENT, MECHANIZATION, AND OUTPUT PER MAN AT BITUMINOUS COAL AND LIGNITE MINES IN THE UNITED STATES, 1905–49.



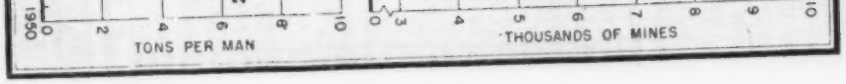



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TABLE K–2.—*Salient trends in bituminous-coal and lignite mining industry in the United States, 1941–49*

| | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 |
|---|---|---|---|---|---|---|---|---|---|
| Average number of men employed at mines active: | | | | | | | | | |
| Underground.....men | 376,765 | 374,654 | 326,763 | 301,461 | 290,001 | [1] 296,030 | [1] 311,369 | [1] 330,292 | 326,758 |
| Surface: | | | | | | | | | |
| In strip pits.....do | 10,861 | 12,893 | 16,643 | 21,035 | 23,261 | [1] 25,408 | [1] 29,783 | [1] 32,178 | 29,267 |
| All others.....do | 69,355 | 74,444 | 72,601 | 70,851 | 69,838 | [1] 74,996 | [1] 78,030 | [1] 79,161 | 77,673 |
| Total.....do | 456,981 | 461,991 | 416,007 | 393,347 | 383,100 | [1] 396,434 | [1] 419,182 | [1] 441,631 | 433,698 |
| Average number of days mines operated | 216 | 246 | 264 | 278 | 261 | 214 | 234 | 217 | 157 |
| Capacity of active mines with existing labor force, per year of 280 days.....net tons | 666,000,000 | 663,000,000 | 626,000,000 | 624,000,000 | 620,000,000 | 699,000,000 | 755,000,000 | 774,000,000 | 781,000,000 |
| Output per man per day.....do | 5.20 | 5.12 | 5.38 | 5.67 | 5.78 | 6.30 | 6.42 | 6.26 | 6.43 |
| Output per man per year.....do | 1,125 | 1,261 | 1,419 | 1,575 | 1,508 | 1,347 | 1,504 | 1,358 | 1,010 |
| Underground output cut by machine.....do | 408,510,296 | 462,344,719 | 461,051,743 | 469,458,349 | 424,726,432 | 382,133,540 | 442,101,535 | 460,012,309 | 303,384,584 |
| Percent of underground output cut by machine | 89.0 | 89.7 | 90.3 | 90.5 | 90.8 | 90.8 | 90.0 | 90.7 | 91.4 |
| Underground output mechanically loaded.....net tons | 186,667,250 | 232,902,920 | 249,805,214 | 274,189,132 | 262,512,729 | 245,340,768 | 298,157,281 | 295,806,285 | 222,375,882 |
| Percent of underground output mechanically loaded | 40.7 | 45.2 | 48.9 | 52.9 | 56.1 | 58.4 | 60.7 | 64.3 | 67.0 |
| Quantity mined by stripping.....net tons | 55,071,609 | 67,202,663 | 79,685,175 | 100,898,376 | 109,986,865 | 112,963,717 | 139,395,011 | 139,505,920 | 106,045,299 |
| Percent mined by stripping | 10.7 | 11.5 | 13.5 | 16.3 | 19.0 | 21.1 | 22.1 | 23.3 | 24.2 |
| Quantity cleaned by wet or pneumatic process [2].....net tons | 117,539,522 | 142,187,346 | 145,575,849 | 158,727,129 | 147,885,936 | 138,669,837 | 174,435,937 | 180,880,323 | 153,651,903 |
| Percent cleaned by wet or pneumatic process [2] | 22.9 | 24.4 | 24.7 | 25.6 | 25.6 | 26.0 | 27.7 | 30.2 | 35.1 |

[1] Average number of men working daily.
[2] Includes central washeries operated by consumers.

TABLE K–3.—*Employment, hours and earnings—Bituminous coal and lignite*

[Includes establishments primarily engaged in mining from underground and surface mines and type of coal except Pennsylvania anthracite, such as bituminous and other soft-coal varieties, or in operating soft-coal breakers or preparation plants]

| Year | All employees [1] | Production and related workers [1] | | | |
|---|---|---|---|---|---|
| | Number (thousands) | Number (thousands) | Average weekly earnings | Average weekly hours | Average hourly earnings |
| 1939 | 388.3 | 371.7 | $23.88 | 27.1 | $0.886 |
| 1940 | 434.9 | 416.4 | 24.71 | 28.1 | .883 |
| 1941 | 431.4 | 413.0 | 30.86 | 31.1 | .993 |
| 1942 | 474.6 | 454.4 | 35.02 | 32.9 | 1.059 |
| 1943 | 437.2 | 418.5 | 41.62 | 36.6 | 1.139 |
| 1944 | 419.2 | 401.3 | 51.27 | 43.4 | 1.186 |
| 1945 | 383.7 | 366.5 | 52.25 | 42.3 | 1.240 |
| 1946 | 372.7 | 355.1 | 58.03 | 41.6 | 1.401 |
| 1947 | 425.6 | 402.1 | 66.59 | 40.7 | 1.636 |
| 1948 | 438.2 | 413.1 | 72.12 | 38.0 | 1.898 |
| 1949 | 399.0 | 373.4 | 63.28 | 32.6 | 1.941 |
| 1950 (April) | 419.0 | 393.8 | 72.79 | 36.0 | 2.022 |

[1] Data are based upon reports from cooperating establishments covering both full- and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by social insurance agency data through 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. The employment data have been revised from January 1947 forward. Hours and earnings data pertain only to production and related workers and were not affected by this revision.

TABLE K–4.—*Statistical trends in the Pennsylvania anthracite industry, 1915–49*

| Year | Average number of employees | Average number of days worked | Average tons per man per day | Quantity cut by machines (net tons) | Quantity produced by stripping (net tons) | Quantity loaded mechanically underground [1] (net tons) |
|---|---|---|---|---|---|---|
| 1915 | 176,552 | 230 | 2.19 | 1,307,756 | 1,121,603 | ---------- |
| 1916 | 159,869 | 253 | 2.16 | 1,839,506 | 1,987,800 | ---------- |
| 1917 | 154,174 | 285 | 2.27 | 1,955,223 | 2,301,588 | ---------- |
| 1918 | 147,121 | 293 | 2.29 | 1,857,514 | 2,360,183 | ---------- |
| 1919 | 154,571 | 266 | 2.14 | 1,575,205 | 2,006,879 | ---------- |
| 1920 | 145,074 | 271 | 2.28 | 938,073 | 2,054,441 | ---------- |
| 1921 | 159,499 | 271 | 2.09 | 979,145 | 2,027,790 | ---------- |
| 1922 | 156,849 | 151 | 2.31 | 502,793 | 949,745 | ---------- |
| 1923 | 157,743 | 268 | 2.21 | 1,208,542 | 2,263,098 | ---------- |
| 1924 | 160,009 | 274 | 2.00 | 1,423,884 | 1,865,677 | ---------- |
| 1925 | 160,312 | 182 | 2.12 | 941,189 | 1,578,478 | ---------- |
| 1926 | 165,386 | 244 | 2.09 | 931,650 | 2,401,356 | ---------- |
| 1927 | 165,259 | 225 | 2.15 | 1,171,888 | 2,153,156 | 2,223,281 |
| 1928 | 160,681 | 217 | 2.17 | 1,289,809 | 2,422,924 | 2,351,074 |
| 1929 | 151,501 | 225 | 2.16 | 1,159,910 | 1,911,766 | 3,470,158 |
| 1930 | 150,804 | 208 | 2.21 | 1,410,123 | 2,536,288 | 4,467,750 |
| 1931 | 139,431 | 181 | 2.37 | 1,587,265 | 3,813,237 | 4,384,780 |
| 1932 | 121,243 | 162 | 2.54 | 1,674,223 | 3,980,973 | 5,433,340 |
| 1933 | 104,633 | 182 | 2.60 | 1,648,249 | 4,932,069 | 6,557,267 |
| 1934 | 109,050 | 207 | 2.53 | 1,981,088 | 5,798,138 | 9,284,486 |
| 1935 | 103,269 | 189 | 2.68 | 1,848,095 | 5,187,072 | 9,279,057 |
| 1936 | 102,081 | 192 | 2.79 | 2,162,744 | 6,203,267 | 10,827,946 |
| 1937 | 99,085 | 189 | 2.77 | 1,984,512 | 5,696,018 | 10,683,837 |
| 1938 | 96,417 | 171 | 2.79 | 1,588,407 | 5,095,341 | 10,151,669 |
| 1939 | 93,138 | 183 | 3.02 | 1,881,884 | 5,486,479 | 11,773,833 |
| 1940 | 91,313 | 186 | 3.02 | 1,816,483 | 6,352,700 | 12,326,000 |
| 1941 | 88,054 | 203 | [2] 3.04 | 1,855,422 | 7,316,574 | 13,441,987 |
| 1942 | 82,121 | 239 | [2] 2.95 | 2,285,640 | 9,070,933 | 14,741,459 |
| 1943 | 79,153 | 270 | [2] 2.78 | 1,624,883 | 8,989,387 | 14,745,793 |
| 1944 | 77,591 | 292 | [2] 2.79 | 1,336,082 | 10,953,030 | 14,975,146 |
| 1945 | 72,842 | 269 | [2] 2.79 | 1,210,171 | 10,056,325 | 13,927,955 |
| 1946 | 78,145 | 271 | [2] 2.84 | 1,232,828 | 12,858,930 | 15,619,162 |
| 1947 | 78,600 | 259 | [2] 2.78 | 1,209,983 | 12,603,545 | 16,054,011 |
| 1948 | 76,215 | 265 | [2] 2.81 | 1,016,757 | 13,352,874 | 15,742,368 |
| 1949 | 75,377 | 195 | [2] 2.87 | 557,599 | 10,376,808 | 11,858,088 |

[1] Data first collected in 1929.
[2] Output per man per day calculated on legitimate tonnages only; "bootleg" purchases excluded.

FIGURE K–2.—PRODUCTION AND AVERAGE NUMBER OF MEN EMPLOYED IN THE ANTHRACITE INDUSTRY, 1915–49.

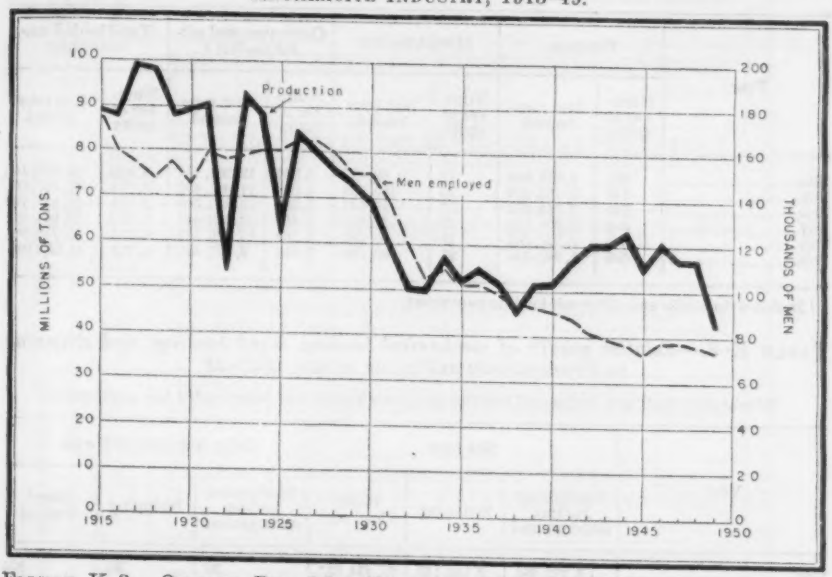



FIGURE K–3.—OUTPUT PER MAN-DAY AND PERCENT OF TOTAL ANTHRACITE PRODUCTION LOADED MECHANICALLY UNDERGROUND, 1915–48.

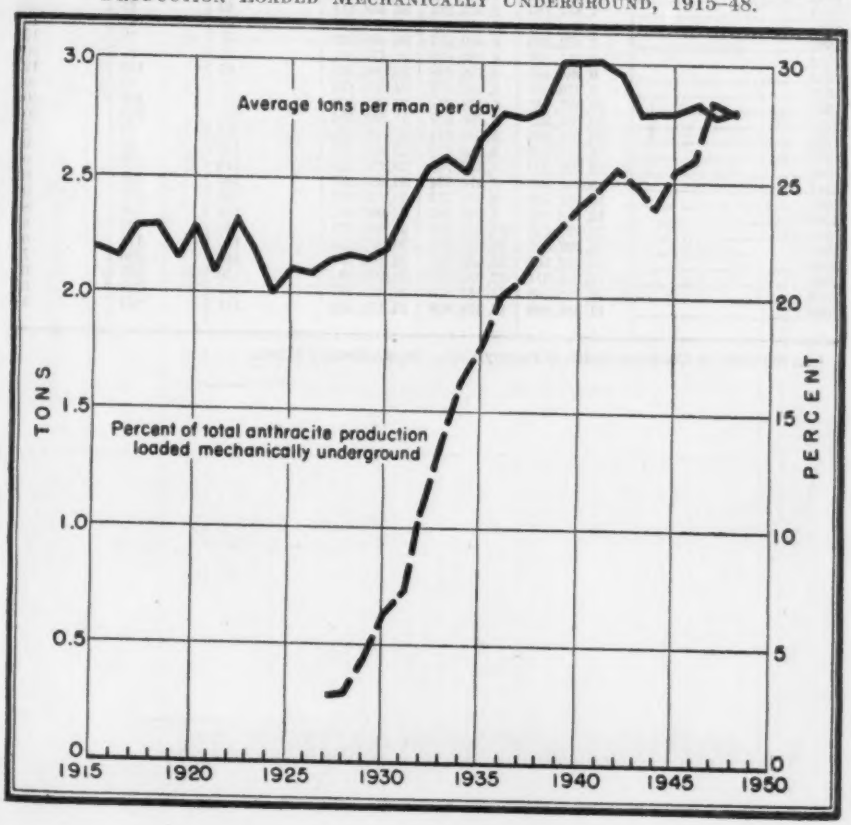


TABLE K–5.—*Pennsylvania anthracite loaded mechanically underground, 1944–49*

| Year | Scrapers | | Mobile loaders | | Conveyors and pit-car loaders [1] | | Total loaded mechanically | |
|---|---|---|---|---|---|---|---|---|
| | Number of units | Net tons loaded | Number of units | Net tons loaded | Number of units | Net tons loaded | Number of units | Net tons loaded |
| 1944 | 491 | 2, 811, 824 | 12 | 69, 837 | 2, 807 | 12, 093, 485 | 3, 310 | 14, 975, 146 |
| 1945 | 548 | 2, 747, 254 | 20 | 146, 209 | 3, 006 | 11, 034, 492 | 3, 574 | 13, 927, 955 |
| 1946 | 564 | 2, 714, 051 | 27 | 81, 545 | 3, 233 | 12, 823, 566 | 3, 824 | 15, 619, 162 |
| 1947 | 594 | 2, 371, 370 | 25 | 132, 237 | 3, 457 | 13, 550, 404 | 4, 076 | 16, 054, 011 |
| 1948 | 643 | 2, 721, 180 | 19 | 60, 657 | 3, 562 | 12, 960, 531 | 4, 224 | 15, 742, 368 |
| 1949 | 589 | 1, 950, 508 | 27 | 80, 104 | 3, 618 | 9, 827, 481 | 4, 234 | 11, 858, 088 |

[1] Includes duckbills and other self-loading conveyors.

TABLE K–6.—*Relative growth of mechanical loading, hand loading, and stripping in Pennsylvania anthracite mines, 1927–48*

[Mechanical loading includes coal handled on pit-car loaders and hand-loaded face conveyors]

| Year | Net tons | | | Index numbers: 1937=100 | | |
|---|---|---|---|---|---|---|
| | Mechanical loading underground | Stripping | Hand loading | Mechanical loading underground | Stripping | Hand loading |
| 1927 | [1] 2, 223, 281 | 2, 153, 156 | 71, 434, 537 | 20 | 38 | 224 |
| 1928 | [1] 2, 351, 074 | 2, 422, 924 | 67, 373, 788 | 22 | 43 | 211 |
| 1929 | 3, 470, 158 | 1, 911, 766 | 66, 493, 690 | 32 | 34 | 209 |
| 1930 | 4, 467, 750 | 2, 536, 288 | 60, 458, 344 | 42 | 45 | 190 |
| 1931 | 4, 384, 780 | 3, 813, 237 | 49, 074, 722 | 41 | 67 | 154 |
| 1932 | 5, 433, 340 | 3, 980, 973 | 38, 400, 820 | 51 | 70 | 120 |
| 1933 | 6, 557, 267 | 4, 932, 069 | 34, 474, 844 | 61 | 87 | 108 |
| 1934 | 9, 284, 486 | 5, 798, 138 | 39, 290, 255 | 87 | 102 | 123 |
| 1935 | 9, 279, 057 | 5, 187, 072 | 34, 503, 819 | 87 | 91 | 108 |
| 1936 | 10, 827, 946 | 6, 203, 267 | 33, 898, 560 | 101 | 109 | 106 |
| 1937 | 10, 683, 837 | 5, 696, 018 | 31, 882, 514 | 100 | 100 | 100 |
| 1938 | 10, 151, 669 | 5, 095, 341 | 27, 990, 628 | 95 | 89 | 88 |
| 1939 | 11, 773, 833 | 5, 486, 479 | 30, 797, 715 | 110 | 96 | 97 |
| 1940 | 12, 326, 000 | 6, 352, 700 | 29, 190, 837 | 115 | 112 | 92 |
| 1941 | 13, 441, 987 | 7, 316, 574 | 30, 435, 277 | 126 | 128 | 95 |
| 1942 | 14, 741, 459 | 9, 070, 933 | 30, 495, 240 | 138 | 159 | 96 |
| 1943 | 14, 745, 793 | 8, 989, 387 | 27, 990, 005 | 138 | 158 | 88 |
| 1944 | 14, 975, 146 | 10, 953, 030 | 26, 800, 270 | 140 | 192 | 84 |
| 1945 | 13, 927, 955 | 10, 056, 325 | 20, 957, 744 | 130 | 177 | 66 |
| 1946 | 15, 619, 162 | 12, 858, 930 | 22, 465, 295 | 146 | 226 | 70 |
| 1947 | 16, 054, 011 | 12, 603, 545 | 20, 909, 101 | 150 | 221 | 66 |
| 1948 | 15, 742, 368 | 13, 352, 874 | 21, 432, 923 | 147 | 234 | 67 |
| 1949 | 11, 858, 088 | 10, 376, 808 | 15, 172, 562 | 111 | 182 | 48 |

[1] As reported by Commonwealth of Pennsylvania, Department of Mines.

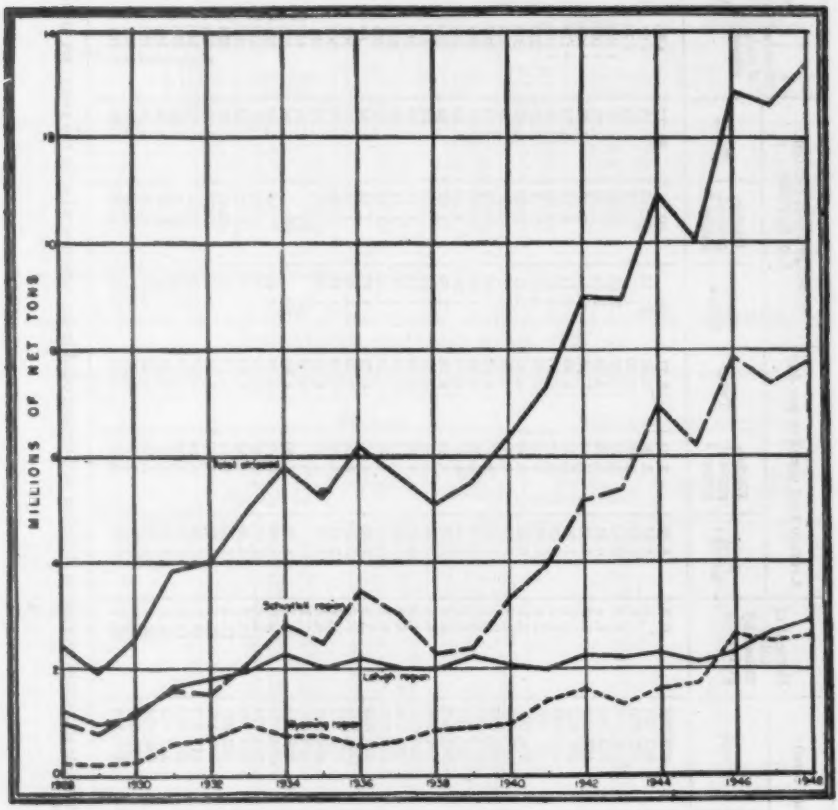
TABLE K–7.—*Growth of strip mining at bituminous-coal and lignite mines in the United States, 1944–*

TABLE K–7.—*Growth of strip mining at bituminous-coal and lignite mines in the United States, 1914–49*

| Year | Production (thousand net tons) | | | Percent of total mined by stripping | Average tons per man per day | | | Average value per ton, f. o. b. mine | | | Number of strip mines | Number of power shovels and draglines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strip mines | Underground mines | Total | | Strip mines [1] | Underground mines [2] | Total | Strip mines [1] | Underground mines [2] | Total | | |
| 1914 | 1,281 | 421,423 | 422,704 | 0.3 | 5.06 | 3.71 | 3.71 | [3] | [3] | $1.17 | [4] 35 | 48 |
| 1915 | 2,832 | 439,792 | 442,624 | .6 | 5.81 | 3.90 | 3.91 | $1.18 | $1.13 | 1.13 | [4] 60 | 87 |
| 1916 | 3,933 | 498,587 | 502,520 | .8 | 6.67 | 3.88 | 3.90 | 1.51 | 1.32 | 1.32 | [4] 79 | 111 |
| 1917 | 5,790 | 546,001 | 551,791 | 1.0 | 6.52 | 3.75 | 3.77 | 2.34 | 2.26 | 2.26 | [4] 126 | 182 |
| 1918 | 8,288 | 571,098 | 579,386 | 1.4 | 6.81 | 3.76 | 3.78 | 2.54 | 2.58 | 2.58 | [4] 165 | 276 |
| 1919 | 5,635 | 460,225 | 465,860 | 1.2 | 6.21 | 3.82 | 3.84 | 2.33 | 2.49 | 2.49 | [4] 168 | 287 |
| 1920 | 8,860 | 559,807 | 568,667 | 1.5 | 7.20 | 3.97 | 4.00 | 4.12 | 3.74 | 3.75 | [4] 174 | 312 |
| 1921 | 5,057 | 410,865 | 415,922 | 1.2 | 8.28 | 4.18 | 4.20 | 2.87 | 2.89 | 2.89 | [4] 155 | 279 |
| 1922 | 10,209 | 412,059 | 422,268 | 2.4 | 8.09 | 4.24 | 4.28 | 3.07 | 3.02 | 3.02 | 272 | 379 |
| 1923 | 11,940 | 552,625 | 564,565 | 2.1 | 9.32 | 4.43 | 4.47 | 2.31 | 2.69 | 2.68 | 263 | 442 |
| 1924 | 13,607 | 470,080 | 483,687 | 2.8 | 9.91 | 4.50 | 4.56 | 2.00 | 2.20 | 2.20 | 234 | 420 |
| 1925 | 16,871 | 503,182 | 520,053 | 3.2 | 11.18 | 4.45 | 4.52 | 1.84 | 2.05 | 2.04 | 227 | 389 |
| 1926 | 16,923 | 556,444 | 573,367 | 3.0 | 11.13 | 4.42 | 4.50 | 1.89 | 2.07 | 2.06 | 237 | 410 |
| 1927 | 18,378 | 499,385 | 517,763 | 3.6 | 11.06 | 4.47 | 4.55 | 1.90 | 1.99 | 1.99 | 255 | 455 |
| 1928 | 19,789 | 480,956 | 500,745 | 4.0 | 13.02 | 4.61 | 4.73 | 1.69 | 1.87 | 1.86 | 250 | 415 |
| 1929 | 20,268 | 514,721 | 534,989 | 3.8 | 14.08 | 4.73 | 4.85 | 1.57 | 1.79 | 1.78 | 200 | 411 |
| 1930 | 19,842 | 447,684 | 467,526 | 4.3 | 16.21 | 4.93 | 5.06 | 1.54 | 1.71 | 1.70 | 218 | 341 |
| 1931 | 18,932 | 363,157 | 382,089 | 5.0 | 17.68 | 5.12 | 5.30 | 1.51 | 1.54 | 1.54 | 235 | 314 |
| 1932 | 19,641 | 290,069 | 309,710 | 6.3 | 16.95 | 4.99 | 5.22 | 1.32 | 1.31 | 1.31 | 255 | 332 |
| 1933 | 18,270 | 315,360 | 333,630 | 5.5 | 13.59 | 4.60 | 4.78 | 1.33 | 1.34 | 1.34 | 89 | 389 |
| 1934 | 20,790 | 338,578 | 359,368 | 5.8 | 13.28 | 4.23 | 4.40 | 1.49 | 1.76 | 1.75 | 344 | 458 |
| 1935 | 23,647 | 348,726 | 372,373 | 6.4 | 12.01 | 4.32 | 4.50 | 1.47 | 1.79 | 1.77 | 368 | 507 |
| 1936 | 28,126 | 410,962 | 439,088 | 6.4 | 13.91 | 4.42 | 4.62 | 1.49 | 1.77 | 1.76 | 381 | 562 |
| 1937 | 31,751 | 413,780 | 445,531 | 7.1 | [3] | [3] | 4.69 | [3] | [3] | 1.94 | 449 | [3] |
| 1938 | 30,407 | 318,138 | 348,545 | 8.7 | 15.00 | 4.60 | 4.89 | [3] | [3] | 1.95 | 465 | 737 |
| 1939 | 37,722 | 357,133 | 394,855 | 9.6 | 14.68 | 4.92 | 5.25 | 1.49 | 1.88 | 1.84 | 537 | 914 |
| 1940 | 43,167 | 417,604 | 460,771 | 9.4 | 15.63 | 4.86 | 5.09 | 1.56 | 1.94 | 1.91 | 638 | 1,071 |
| 1941 | 55,071 | 459,078 | 514,149 | 10.7 | 15.59 | 4.83 | 5.20 | 1.79 | 2.23 | 2.19 | 769 | 1,321 |
| 1942 | 67,203 | 515,490 | 582,693 | 11.5 | 15.52 | 4.74 | 5.12 | 1.90 | 2.41 | 2.36 | 834 | 1,438 |
| 1943 | 79,685 | 510,492 | 590,177 | 13.5 | 15.15 | 4.89 | 5.38 | 2.28 | 2.75 | 2.69 | 1,004 | 1,839 |
| 1944 | 100,898 | 518,678 | 619,576 | 16.3 | 15.89 | 5.04 | 5.67 | 2.48 | 3.01 | 2.92 | 1,240 | 2,312 |
| 1945 | 109,987 | 467,630 | 577,617 | 19.0 | 15.46 | 5.04 | 5.78 | 2.65 | 3.16 | 3.06 | 1,370 | 2,439 |
| 1946 | 112,964 | 420,958 | 533,922 | 21.1 | 15.73 | 5.43 | 6.30 | 2.87 | 3.59 | 3.44 | 1,445 | 2,744 |
| 1947 | 139,395 | 491,229 | 630,624 | 22.1 | 15.93 | 5.49 | 6.42 | 3.47 | 4.35 | 4.16 | 1,750 | 3,254 |
| 1948 | 139,506 | 460,012 | 599,518 | 23.3 | 15.28 | 5.31 | 6.26 | 4.11 | 5.26 | 4.99 | 1,971 | 3,712 |
| 1949 | 106,045 | 331,822 | 437,868 | 24.2 | 15.33 | 5.42 | 6.43 | 3.94 | 5.18 | 4.88 | 1,761 | 3,576 |

[1] Includes power strip pits proper and excludes horse stripping operations and mines combining stripping and underground in the same operation for the years 1914 to 1942, inclusive. The years 1943 to 1948, inclusive, include data, on all strip mines.
[2] Computed by deducting "Strip mines" data from "Total."
[3] Data not available.
[4] Exclusive of horse stripping operations.

FIGURE K–4.—PENNSYLVANIA ANTHRACITE MINED FROM STRIP PITS, BY REGIONS, 1928–48.




Source: Minerals Yearbook, 1948.

TABLE K–8.—*Relative growth of Pennsylvania anthracite mined from strip pits, 1915, 1920, 1925, 1930, and 1944–49*

| | Net tons mined by stripping | Percent of fresh-mined total that was stripped | Number of men employed | Average number of days worked |
|---|---|---|---|---|
| 1915 | 1,121,603 | (1) | (1) | (1) |
| 1920 | 2,054,441 | 2.5 | (1) | (1) |
| 1925 | 1,578,478 | 2.7 | (1) | (1) |
| 1930 | 2,536,288 | 3.7 | (1) | (1) |
| 1944 | 10,953,030 | 20.8 | 5,595 | 246 |
| 1945 | 10,056,325 | 22.4 | 5,314 | 238 |
| 1946 | 12,858,930 | 25.2 | 6,152 | 252 |
| 1947 | 12,603,545 | 25.4 | 7,264 | 242 |
| 1948: | | | | |
| Lehigh region | 2,990,851 | 34.7 | 1,691 | 261 |
| Schuylkill region | 7,758,109 | 47.3 | 4,019 | 258 |
| Wyoming region | 2,603,914 | 10.2 | 1,295 | 267 |
| Total [2] | 13,352,874 | 26.5 | 7,005 | 260 |
| 1949 [2] | 10,376,808 | 27.7 | 7,386 | 198 |

[1] Data not available.
[2] No production by stripping in Sullivan County in 1948.

TABLE K–9.—*Power shovels and draglines used in stripping Pennsylvania anthracite, by type of power, 1946–49*

| Type of power | 1946 | | | 1947 | | |
|---|---|---|---|---|---|---|
| | Number of power shovels | Number of draglines | Total | Number of power shovels | Number of draglines | Total |
| Gasoline | 68 | 20 | 88 | 75 | 23 | 98 |
| Electric | 33 | 44 | 77 | 47 | 46 | 93 |
| Diesel | 155 | 254 | 409 | 158 | 256 | 414 |
| All other | 6 | | 6 | 4 | | 4 |
| Total | 262 | 318 | 580 | 284 | 325 | 609 |

| Type of power | 1948 | | | 1949 | | |
|---|---|---|---|---|---|---|
| | Number of power shovels | Number of draglines | Total | Number of power shovels | Number of draglines | Total |
| Gasoline | 65 | 8 | 73 | 66 | 20 | 86 |
| Electric | 54 | 46 | 100 | 53 | 45 | 98 |
| Diesel | 182 | 256 | 438 | 139 | 253 | 442 |
| All other | 3 | | 3 | 1 | | 1 |
| Total | 304 | 310 | 614 | 309 | 318 | 627 |

TABLE K–10.—*Anthracite group—Employment, hours, and earnings*

[Includes establishments primarily engaged in the extraction and preparation, by screening and sizing, of anthracite from virgin deposits from breaker waste, and from other sources by operating companies; and the working by contractors of culm banks and strip-pit and underground mines. Anthracite mines are located only in Pennsylvania]

| Year | All employees [1] | Production and related workers [1] | | | |
|---|---|---|---|---|---|
| | Number (thousands) | Number (thousands) | Average weekly earnings | Average weekly hours | Average hourly earnings |
| 1939 | 88.9 | 83.6 | $25.67 | 27.7 | $0.923 |
| 1940 | 91.9 | 86.4 | 24.94 | 27.2 | .924 |
| 1941 | 92.3 | 86.8 | 27.41 | 28.1 | .971 |
| 1942 | 89.0 | 83.6 | 33.85 | 33.7 | .989 |
| 1943 | 83.4 | 78.4 | 40.04 | 37.5 | 1.069 |
| 1944 | 80.8 | 75.9 | 47.93 | 40.7 | 1.178 |
| 1945 | 72.7 | 68.2 | 48.98 | 39.2 | 1.252 |
| 1946 | 81.8 | 76.9 | 57.15 | 38.3 | 1.494 |
| 1947 | 79.4 | 74.6 | 62.77 | 37.7 | 1.665 |
| 1948 | 80.0 | 75.8 | 66.57 | 36.8 | 1.809 |
| 1949 | 77.3 | 72.8 | 56.78 | 30.2 | 1.880 |
| 1950 (April) | 75.3 | 70.7 | 57.25 | 29.0 | 1.974 |

[1] Data are based upon reports from cooperating establishments covering both full- and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by social insurance agency data through 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earnings data pertain only to production and related workers.

TABLE K–11.—*Petroleum and natural gas production—Employment, hours, and earnings*

[Includes establishments primarily engaged in producing crude petroleum or natural gas from wells; natural gasoline from natural gas or from casinghead gas. Contract well drilling and rig building are not included]

| Year | Production and related workers [1] | | | |
|---|---|---|---|---|
| | Number (thousands) | Average weekly earnings | Average weekly hours | Average hourly earnings |
| 1939 | 114.4 | $34.09 | 38.3 | $0.873 |
| 1940 | 112.5 | 34.03 | 37.8 | .881 |
| 1941 | 112.6 | 36.37 | 37.9 | .934 |
| 1942 | 110.0 | 40.35 | 39.0 | 1.014 |
| 1943 | 103.2 | 47.85 | 42.6 | 1.100 |
| 1944 | 106.1 | 53.27 | 45.4 | 1.151 |
| 1945 | 110.7 | 54.24 | 45.2 | 1.197 |
| 1946 | 125.0 | 52.96 | 40.5 | 1.307 |
| 1947 | 120.0 | 59.36 | 40.3 | 1.473 |
| 1948 | 127.1 | 66.68 | 40.0 | 1.667 |
| 1949 | 127.1 | 71.48 | 40.2 | 1.778 |
| 1950 (April) | 123.5 | 74.41 | 41.2 | 1.806 |

[1] Data are based upon reports from cooperating establishments covering both full- and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by social insurance agency data through 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earnings data pertain only to production and related workers.

NOTE.—"All employees" is not available.

TABLE K–12.—*Man-days and direct wages lost in strikes, 1937–48, bituminous coal mining*

[In thousands]

| | Number man-days idle | Direct wage loss dollars | | Number man-days idle | Direct wage loss dollars |
|---|---|---|---|---|---|
| 1937 | 1,925 | 11,530 | 1944 | 1,056 | 10,025 |
| 1938 | 133 | 817 | 1945 | 5,007 | 49,669 |
| 1939 | 7,303 | 45,276 | 1946 | 19,500 | 218,595 |
| 1940 | 153 | 947 | 1947 | 2,190 | 28,667 |
| 1941 | 6,748 | 46,899 | 1948 | 9,560 | 145,121 |
| 1942 | 264 | 1,960 | | | |
| 1943 | 7,510 | 59,858 | Total | 61,349 | 619,364 |

Source: Conference Board Business Record, November-December 1949, p. 445.

## CHAPTER VI

## TECHNOLOGICAL CHANGES

There are three principal areas in the field of energy in which technological changes have occurred and are to be expected:

1. Changes in the methods and approaches employed in the appraisal of the extent and character of energy resources.
2. Changes in the methods of extraction whereby utilizable energy is made available for use and consumption.
3. Changes in methods of end use.

Although it might be expected that the progress of technology invariably results in a net increase in the amount of energy available for increasing use, this has not always been the case. The record far too frequently reflects a tendency toward profligate, rather than wise, extraction and utilization of fuel resources. Fortunately there have always been those who have pressed for rational approaches toward conservation by relying on technological advances to extend the limits of our knowledge on fuel reserves, to render more efficient their extraction, and to economize in their utilization by increasing the efficacy of consuming devices.

For instance, the discovery of oil and gas producing areas is a measure of the improvement of exploratory or probing devices such as those employing seismic measurements, and of our knowledge of the geologic processes fundamental to the accumulation of petroleum and natural gas. Great advances have also been made in recovery methods. Refinements in drilling techniques—involving such things as better drilling and casing steels, for instance—have made it possible to reach deeper and deeper into the earth's crust. Modern chemical methods employed in oil refineries and gas processing plants provide industry with a truly fantastic variety of important organic chemicals besides improving the quantities and quality of recoverable energy per unit of natural fuel.

In the coal industry, the development of large machinery for the mining and underground transport of coal has resulted in rising levels of production per unit of labor employed. Advanced techniques in the treatment of coal have been a boon in raising its value as a source of energy in opening a storehouse of valuable industrial chemicals.

The generation and transmission of electric power today also reflect the advance of technical discoveries. The efficiency of electric power generation, by steam or internal combustion prime movers or by waterwheels, has improved steadily. High temperatures necessary for modern steam-electric turbines could not be practically achieved without the commercial development and production of high-temperature, corrosion-resistant alloy steels. In transmission, the steady increase in the employment of high voltages—in excess of 200,000 volts—makes it practical economically to tie together vast power-producing and power-consuming regions. Such developments draw upon not only the extraordinary advances in electrical engineering,

but in a corollary manner on advances in ceramics, for insulators; better steels, for transformer cores; better oils and synthetics, for insulation; electronic devices for the control of every portion of high capacity electric systems.

The examples can be multiplied almost infinitely. Fundamentally, they reflect advances in our ability to observe, to interpret, and apply fundamental physical and chemical facts. That is to say, every improvement relies on a veritable pyramid of basic research. The answers to vexing problems created by our insatiable appetite for energy must rely therefore in very large measure on the continuous and accelerated development of new techniques which in turn will be based on the extension of fundamental research.

Although the bulk of this discussion will be devoted to the consideration of certain important segments of current and immediately anticipated technologic advances in the three principal areas in the field of energy, there is emerging greater consciousness than ever before in our industrial civilization of the possible use of energy resources hitherto neglected or formerly unavailable for practical purposes. That is to say that we may be entering a new era of energy utilization—looking forward to such fundamental sources as those available through the fission of atomic energy, by the direct capture of solar radiation, by the harnessing on a large scale of wind and tidal power.

In the consideration of the tapping of these fundamental sources of energy, there are already evidences of the types of techniques which will probably be employed. However, the factors of practicality, basically those of costs, are still vague and, at best, subject to inadequate evaluation on the scale which may be desirable in the not-too-distant future. In the field of atomic energy, of course, the Atomic Energy Commission and collaborating industry have initiated a program to produce electric power. It is too early to appraise the extent to which this source of energy can become important in meeting our future requirements for energy. Isolated and somewhat spasmodic attempts have been made to utilize direct solar radiation by means of solar boilers and by means of the so-called heat pump. The increasing number of actual applications of the heat pump would seem to indicate reasonable prospects for its widespread utilization for space heating in commercial buildings as well as in residential structures. As to wind power, it is being given serious thought as a means of electric power generation. The possibilities of utilizing the ceaseless ebb and flow of the ocean on our shores have long intrigued the attention of the engineer. The Passamaquoddy in Maine, which would have been the first major undertaking for the use of oceanic tides, is again receiving formal attention. It might well be a source of dependable energy in the near future.

In terms of most immediate technological advances which will profoundly and favorably affect the energy and fuels situation in the United States are the following: Improved discovery techniques; synthetic liquid fuels from coal, shales, and natural gas; fuels from agricultural products; underground gasification of coal; and developments in fuel-burning and fuel-consuming equipment.

### 1. Improved Discovery Techniques

The history of prospecting for petroleum in the United States reflects a progressive development of new techniques from the pioneer manner of drilling near oil seeps to the more recent geologic and geophysical methods employed in discovering deeply buried structural and stratigraphic traps. The earliest scientific exploration began when mapping of the rocks at the surface was undertaken to determine the location of anticlines, domes, and structural noses favorable to the accumulation of oil. Surface mapping, which continues today throughout the country for detailed information in areas not extensively explored, was followed by core drilling and geophysical exploration. Following World War I, geophysical methods, including the torsion-balance, seismograph, and the magnetometer were used extensively as aids in locating favorable structures; later the gravity meter was developed for similar work. Heavy mineral and micropaleontologic studies were started at about the same time as these extensive geophysical programs and have been very useful in the correlation of beds between wells and determining the subsurface structure of the rocks.

Each newly developed technique has aided in the finding of additional proved petroleum reserves. A whole series of refinements continue to improve our ability to obtain basic information. For example, subsurface studies, starting with the correlation of driller's logs, have been advanced by the results obtained through the use of drill cuttings, cores, heavy minerals, micropaleontology, electrical, and radioactive logs.

New techniques have also been developed for the drilling of wells and in the production of oil and gas after discovery. Research in the fields of exploration, drilling, and production is in constant progress by the petroleum industry. A number of companies have large laboratories where such work is being carried on. Federal and State laboratories together with these private companies are engaged in devising new equipment and techniques. For instance, the vast improvements in techniques of drilling are illustrated by the successively greater depths to which wells can be drilled. A well was recently drilled in Wyoming to a depth of more than 20,000 feet, and commercial production has been obtained at a depth of more than 15,000 feet in California. Thus the ability of the industry to drill to such depths has brought large areas of deeply buried potential reservoir rocks within reach of the earth's surface and consequently may be expected to add new producing areas to our proved reserves. In most of the deep basins in the country, few wells have been drilled below 10,000 feet and yet the thickness of the sedimentary sequence ranges to 65,000 feet or more. This means that many thousands of cubic miles of deep sedimentary rocks have not yet been explored and tested. The present drilling on the Continental Shelf, which is limited by the type of equipment used, is in water less than 100 feet deep. The development of new equipment and new techniques may permit drilling in water at greater depths, thus opening up new possibilities for the extension of commercially available oil reserves.

The development of all these new techniques in the exploration and production of petroleum has become so advanced that contract service organizations with specialists in particular fields do logging by means of electric, radioactive, temperature, or caliper methods. They also carry out formation-dip reading, gun perforating, side-hole coring. They employ seismic, gravitational, and magnetic methods for the surveying of potential producing areas. In very recent years, these organizations have also begun to utilize on a very large scale air borne magnetic surveys and photogeologic interpretations, modern radar and shoran surveying for offshore exploration. The great amount of data provided by these specialized techniques are important aids to the petroleum geologist and petroleum engineer. By means of these advances the finding and production of oil and gas is much more efficiently and effectively accomplished than in the early years of the industry. The future of advancements in these fields is certainly most promising.

## 2. Synthetic Liquid Fuels

It has been known for many years that, under proper conditions, coal, oil shales and sand, and natural gas can be made to yield liquid fuels. The question has been one of determining the best and most economical way of doing the job on a large scale. Today, it seems clear that the advances of technological research—by private and public research organizations—will assure the Nation of liquid fuel supplies derived from sources other than petroleum. To be sure, there are many improvements yet to be made in processing techniques, in the design of processing plants, for the reduction of costs and in the nature of the final product. The tremendous national importance of providing alternative sources of liquid fuels was recognized by the Congress in the passage of the O'Mahoney-Randolph Act of April 5, 1944. Since then appropriations have served to accelerate research programs primarily, though not exclusively, carried out by the Federal Government.

Processes for the liquefaction of coal and for making synthetic-liquid fuels were developed in Germany some 20 years ago. Both the Bergius-I. G. Farben hydrogenation and the Fischer-Tropsch gas synthesis processes were operated commercially in Germany before and during World War II. These processes are being improved and adapted to American conditions. Diesel fuel, produced synthetically by one of these processes at a Bureau of Mines pilot plant, has powered the engine of a regular train on a regular run.

*Synthetic liquid fuels from natural gas*

Natural gas may be converted into synthetic liquid fuels by modification of the German Fischer-Tropsch or gas synthesis process. The natural gas is first converted to synthesis gas, a mixture of carbon monoxide and hydrogen. The synthesis gas is then converted into liquids by passing it over a catalyst under suitable conditions of temperature and pressure. The products formed range from solid wax to methane and include materials of the volatility of gasoline, Diesel fuel, and gas oil.

By proper selection of catalysts and operating conditions, this gas synthesis process may be made to yield Diesel fuel of high cetane

number and gasoline of relatively low octane number, or a gasoline of octane number satisfactory for automotive use and a Diesel fuel of medium cetane number. The process does not seem to offer much promise for production of high-octane aviation gasoline with good rich mixture performance.

The first commercial synthetic liquid-fuels plant designed to produce gasoline and other liquid fuels from natural gas is now in operation at Brownsville, Tex. This plant has a capacity of 6,500 barrels per day of liquid fuels.

For several reasons it now appears improbable that any great number of such plants will be built: (1) Natural gas is a valuable fuel in its own right without conversion to liquids; (2) a rising demand and a spreading network of pipelines is rapidly taking off the market idle reserves of natural gas that are large enough to justify the capital investment for synthetic-fuel plants; (3) prices for natural gas are on the upgrade; and (4) like petroleum, natural gas is a relatively limited resource.

*Synthetic liquid fuels from coal and shales*

The recovery of utilizable oil from oil shales can be achieved by means of several processes. Among those are the gas-flow process of the United States Bureau of Mines and the one developed by the Union Oil Co. of California. For example, the Bureau of Mines' process involves a delayed coking of the crude shale oil followed by mild hydrogenation of the distillate over a catalyst. All the steps involved are well-known commercial operations that should offer few difficulties in application. The Bureau of Mines has operated an oil-shale demonstration mine and retorting plant for approximately 3 years and an oil-shale refinery for somewhat less time. Because of the research and demonstration programs of industry and the Federal Government, the recovery of oil from shales at this stage is less fraught with questions as to commercial feasibility than the methods for converting coal into synthetic liquid fuels.

As pointed out above, there are two processes for the direct production of synthetic liquid fuels from coal or lignite. These are the Bergius-I. G. Farben coal-hydrogenation process; and the Fischer-Tropsch gas-synthesis process. Liquid fuels are the primary product in both processes; combustible gases and waxes are obtained as by-products. Inasmuch as there are no large residues of valuable coke from the operation of these processes, the primary objective of plants utilizing them is the production of liquid fuels.

The coal-hydrogenation process consists of forcing hydrogen into the complex coal molecules and removing oxygen so that their chemical constitution is changed approximately to that of petroleum, whereupon the coal substance liquifies. The actual operation of the process consists of a high-temperature, high-pressure treatment with hydrogen gas of finely pulverized coal or lignite and heavy oil previously obtained in the process. The oil product, when separated from the resulting solid residue, is then distilled into various oil fractions ranging from heavy to light. The light oil is refined directly into gasoline; the heavy oil is recycled into the process. The middle oil fractions are hydrogenated further. The gasoline produced by means of this process has a high octane value suitable for aviation gasoline.

Most of the high-volatile bituminous, subbituminous coals, and lignites of the United States are suitable for the hydrogenation process.

In the gas-synthesis process, the carbonaceous material, such as any coal, coke, lignite, is converted with the aid of steam to water gas, a mixture of carbon dioxide and hydrogen. After suitable purification, this mixture of gases is treated at relatively low temperatures and pressures with a solid catalyst under which conditions the gases combine to form oils and waxes.

The oils produced in this process have low octane values but can be reformed to about a 70-octane gasoline suitable for motor operation. The process produces an excellent Diesel oil of high cetane rating.

The gas synthesis of the Fischer-Tropsch process has a wider application to more diverse raw materials than does the hydrogenation process. Almost any carbonaceous material can be utilized although, obviously, the economics of so doing will vary. Materials that have been used include anthracite, all ranks of bituminous coal, coke, lignite, coal gas, natural gas, charcoal, wood, and other vegetable matter.

As stated previously, the question is not whether liquid fuels can be made from solid fuels but rather what is the best way of doing the job? Although the techniques still present many questions, they have advanced to a point of application where investigations of costs are becoming feasible. Thus, the programs of research, experimentation, and demonstration being carried out by private industry and predominantly by the United States Bureau of Mines under the O'Mahoney-Randolph Act of 1944 are increasingly being directed to provide answers to operating and cost problems.

The Bureau of Mines is engaged in a comprehensive research and development program on oil from coal at Bruceton, near Pittsburgh, Pa., and on the production of synthesis gas from coal at Morgantown, W. Va. It is also engaged in such work on the gasification of lignite and subbituminous coal at Grand Forks, N. Dak., and at Denver, Colo. Research and development on oil from shale are being carried on at Laramie, Wyo., and large-scale developmental work is well advanced on mining methods and retorting and refining processes at the oil shale deposit at Rifle, Colo.

Large scale pilot-plant work on the production of oil from coal is proceeding at Louisiana, Mo. At that location, a 200-barrel per day hydrogenation unit is in experimental operation, and a 50-barrel per day synthesis gas or modified Fischer-Tropsch unit is nearing completion. Both of these pilot plants include new features and improvements developed by the Bureau of Mines, and also are proceeding on the basis of research information obtained from German plants by American investigators following the close of World War II. Test runs are being made on various runs and types of coal from the different coal fields in the United States. The oils obtained will be in adequate quantity for working appropriate methods of refining and recovery of valuable byproducts.

Inasmuch as mining methods and costs of extraction of oil from oil shales have been an uncertain factor in appraising the possibilities of this material, the Bureau of Mines has operated a demonstration mine at Rifle, Colo. The Bureau has developed a highly mechanized method of mining a 70-foot-thick bed of shale that averages 30 gallons

of crude oil per ton. Operating costs in a recent test were about 30 cents a ton. This low mining cost and a probably lower over-all investment cost for mine and retorting plant than for coal liquefaction plants indicate that oil-shale plants may be among the first synthetic liquid fuel plants on which the Nation can rely as a supplementary source to petroleum. At higher cost, shale oil may be converted to motor fuel by hydrogenation under pressure.

Interest in synthetic liquid fuels production is growing. A number of oil and coal-processing companies are conducting research and developmental work on making oils from natural gas, coal, and oil shales. At present, natural gas and oil shale seem to be the raw materials that will first approach the costs of natural petroleum products. However, further developments, a rising price structure, and the values of natural gas in its original state may bring coal and lignite into the picture earlier than has been generally expected.

*Fuels from Agricultural Products*

One phase of the Federal synthetic liquid fuels program includes the development of processes for the production of synthetic liquid fuels from agricultural products. With funds available through the Department of the Interior, under the O'Mahoney-Randolph Act of 1944, the Bureau of Agricultural and Industrial Chemistry of the Department of Agriculture is conducting a project to determine the manufacturing steps and costs on a semiworks scale of a process for the hydrolysis of agricultural residues to sugars for the production of alcohol and other liquid fuels. The semiworks plant in which this process is being studied was completed in 1946, and actual plant operation has been in progress for the past 4 years.

The hydrolysis process under investigation consists of converting one of the fractions of agricultural residues to pentose sugars and subsequently converting the cellulose fraction to dextrose. The pentose sugars may be fermented to the liquid fuels butanol, isopropanol, acetone, and ethanol, or they may be converted to furfural, or other products of high monetary sales value. The dextrose, of course, may be converted to the liquid fuel ethanol. The economic advantage of this hydrolysis process lies in the fact that the pentose sugars and dextrose can be almost quantitatively separated; therefore, each one in its turn can be converted to maximum yields of end products. On the basis of further work and closer estimates, it now appears that by separating these sugars and fermenting them singly about 65 gallons of liquid fuels can be manufactured per ton of agricultural residues. On the other hand, if these sugars were fermented together, only about 50 gallons of liquid fuels could be manufactured per ton of agricultural residues.

Federal, State, and university laboratories are also conducting investigations on the industrial fermentation of carbohydrates, the utilization of agricultural residues, and the evaluation of agricultural motor fuels.

### 3. Underground Gasification of Coal

The feasibility of extracting fuel and chemical values from coal seams by controlled underground combustion without mining has been under study ever since the conception of the idea by Sir William

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Siemen in 1868. It is only recently that large-scale demonstrations have been undertaken by French, Belgian, English, Russian, and American engineers. The Russians state that large industries located near the Donetz Basin are obtaining their fuel supply from gas supplied by burning coal underground. The reliability of these claims cannot be checked.

The principle of underground gasification entails the isolation of a suitable seam of coal, setting fire at one portion of the seam face, feeding necessary air or oxygen to the combustion zone at controlled rates, and providing a means for collecting the resulting gaseous products of combustion. So far results of large-scale tests indicate that no difficulty is encountered in maintaining combustion of coal underground. They also show that the coal in place can be completely gasified, leaving only an ash and clinker residue. They also indicate that suitable gases can be produced for power production and for synthesis.

The gas produced by burning coal underground consists of a mixture of carbon dioxide, carbon monoxide, nitrogen, hydrogen, methane, and some higher hydrocarbons. These gases can be used for power generation either by means of steam-electric power plants located on the site of underground gasification, for or the direct gas-turbine generation of electricity. In the latter case, the over-all efficiency of such an installation may be from 25 to 50 percent greater than that which is now obtainable from present mining methods followed by coal utilization in steam power plants.

Perhaps of greatest importance are the possibilities of production of gas suitable for synthesis into oil and gasoline. In this instance, the pumping of oxygen instead of air to the underground combustion zone would produce a gas rich in carbon monoxide and hydrogen.

In the United States, major scale experiments have been under way under the joint auspices of the United States Bureau of Mines and the Alabama Power Co. at Gorgas, Ala. The results so far obtained are considered by technicians as most encouraging. Tests are now being directed to the determination of operational characteritistics of possible large scale commercial application. These include such problems as the quantity of coal which can be gasified and under what conditions; the types of gas outlets which will be most efficient; fundamental technical and economic information of influence on plant size, plant location, plant installation and operating costs.

These experiments have so far been conducted only on horizontal seams which are clearly recognized as the most difficult to work with. It is expected that seams having considerable pitch will be much easier to gasify.

The possibilities of underground gasification are very great. For example, it may eventually be possible to utilize coal seams heretofore considered valueless, such as those too steeply pitched to permit economic mining.

### 4. New Developments in Fuel-Burning and Fuel-Consuming Equipment

The opportunities are very great to extend the lifetime of our present energy sources by the reduction of losses of the conversion of energy to useful heat or power. Aside from the physically avoidable losses of coal and oil left in the ground and gas burned in the air, roughly 65

percent of the energy contained in the resources we put to use is lost because of various inefficiencies. A slight increase in the efficiency of use in motive equipment such as automobiles would be represented in substantial savings in our over-all petroleum consumption. About 10 percent of our home heating fuel is wasted because most furnaces are either obsolete or operated inefficiently. Another half of the fuel is wasted because nine-tenths of our homes are either inadequately or improperly insulated. A large portion of these over-all losses could be prevented without diminishing the comfort provided by and the ease with which energy resources can be used. By and large, this waste is an evidence of our profligate habits.

There is definite indication that industry, as well as the consumer, are conscious of this problem and of the opportunities for remedy. Technologic advances in automotive design, whether by increases in engine efficiency or by cutting down the dead weight of the body and chassis, already provide greater mileages per gallon of fuel in spite of very great advances in the average speed with which motorcars are being driven. Modern heating plants for the home are being designed for higher efficiencies. Greater consideration is being given to adequate insulation and to maximum locational orientation to take advantage of solar radiation. Yet, the possibilities of further improvements have been barely tapped.

In the field of industrial burning equipment, installations since the last war have included many automatic features. Where coal is used the equipment has been designed to burn a much wider variety of coals than formerly thought necessary. At the same time, higher fuel costs have placed a premium on higher efficiencies even though necessitating higher capital investment costs. The net result, however, is that less coal has become necessary to obtain the same results. Public utility plants for the generation of steam and electric power have shown marked and continued improvement in fuel utilization, and the trends continue markedly in that direction. Probably the greatest single development in the coal-burning field has been the wide use, particularly in smaller installations, of the spreader stoker which can handle a vary wide range of coals efficiently.

In the domestic field, there continues to be much activity toward the design of automatic coal-stoker equipment. In large measure, this is a result of the keen competition offered solid fuels by oil and gas. The increasing use of such automatic equipment will affect the size of coal used for domestic heating. On the other hand, the effect of stoker use upon the over-all amount of domestic coal burned is not apt to be considerable at this time. Part of the reason for this is the fact that the resulting greater efficiency of use results in somewhat less coal being used to provide the same degree of heat and comfort. The desired ultimate type of coal-burning equipment for the home is that which will provide the greatest degree of automatic operation approaching comparability with burners of oil and natural gas.

Another indication of technological improvements designed to broaden the field of utilization of coal is in the coal burning gas turbine. Since 1945 a program has been underway to test and develop a satisfactory coal burning gas turbine that will transform the heat energy of coal into power with greater combustion efficiency than is now possible. Under the aegis of the Locomotive Development Committee, a wide variety of small-scale tests were conducted, followed by the installation of a gas turbine at Dunkirk, N. Y., to evaluate

further the possibilities of this type of power plant for use in locomotives.

In the small-scale tests a combustion chamber was developed that can successfully burn coal at the high rates required by the space limitations of a locomotive and a coal pump was devised that can pressurize finely pulverized coal. Though the operation of the experimental turbine at Dunkirk has shown that the proposed system of coal handling and combustion is adequate for power plants operating at steady loads, control equipment must be developed that will be sufficiently rapid in its response for locomotive service. Work is underway to improve ash removal and to eliminate localized concentrations of dust particles. A unit especially designed for experimental installation on a locomotive has been constructed and is now undergoing test as a stationary turbine.

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